for

# Physicians and Surgeons in Industry

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# Industrial Medicine

Reg. U. S. Pat. Off.

For the Cumulative Study of:
The Industrial Interrelation of
**Medicine, Law, Insurance and Economics**

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Costs,
Hazards,
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Records,
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*This magazine is published to promote sound thought upon and concerning industrial medicine. To that end it will contain articles, news items, reports, digests and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited. The editors will exercise care in checking on the accuracy of data printed, but in all other respects articles and opinions of which expression is allowed are the articles and opinions of their authors—the editors reserving in all cases the right to comment on the same, in the current or any subsequent issues, as they may be inclined.*

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*Laugh and be merry together,*
*like brothers akin,*
*Guesting awhile in the rooms*
*of a beautiful inn.*
*Glad till the dancing stops,*
*and the lilt of the music*
*ends.*
*Laugh till the game is played:*
*and be you merry, my*
*friends.*—JOHN MASEFIELD.

# Industrial Medicine

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*Best trust the happy moments.*
*What they gave*
*Makes man less fearful of the*
*certain grave,*
*And gives his work compassion*
*and new eyes.*
*The days that make us happy*
*make us wise.*

—JOHN MASEFIELD.

**The Law, the Science and the Economics of Industrial Health**

**Volume 2** **AUGUST, 1933** **Number 2**

# Health Activities

## —*Need, Principles and Practical Suggestions*—

*by*

LEVERETT D. BRISTOL, M. D., DR. P. H.
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*American Telephone and Telegraph Company*
*New York, N. Y.*

AFTER the end of the year, and the lull which follows the season of holiday shopping, many business men are in the habit of "taking stock." At the beginning of a new year, if not indeed at the beginning of a new epoch in the industrial life of this country, and following a lull in all personnel activities, including industrial health work, as a result of the economic depression, it would seem to be most appropriate and opportune for personnel workers to "take stock."

### Development of the Health Appraisal Plan

THE APPRAISAL or scoring method in general has been adapted to various fields of human activity. Many years ago those interested in hygiene and sanitation developed scoring systems in connection with the inspection of public dairies and restaurants. Such places now are rated on the basis of their positive performance in keeping up a high standard of cleanliness and sanitary practices.

One of the first interesting applications of this method was that developed by the National Board of Fire Underwriters in the form of a "Standard Schedule for Grading Cities and Towns of the United States with Reference to Their Fire Defenses and Physical Conditions," which was adopted in 1916. This Schedule logically attempts to rate and grade communities not on the negative side of the problem —the number and extent of fires—but from the positive, preventive standpoint of fire defense and physical conditions. Insurance companies differentiate in fire insurance rates depending on the good standing or poor standing of such protective services. Why not apply this same principle and method to health services in general and attempt to appraise positive physical health practices, and defense against disease, rather than to compare and rate units on the basis of sickness and deaths alone, or lost time due to sickness and accidents? This already has been done so far as state, city and county health work are concerned, under the leadership of the Committee on Administrative Practice of the American Public Health Association; but so far as is known, this is the first attempt to extend the appraisal plan to include industrial health services.

The appraisal form for city health work was first prepared as a preliminary outline by Dr. Charles V. Chapin in 1923 and since that time has been developed and revised by the American Public Health Association on the basis of group study and experimentation on the part of health officers and other experts in the health field. Out of this also developed an "Appraisal Form for Rural, County or District Health Work."

While these forms originally met with some opposition on the part of a few health officers, due to fears of their misuse, it may now be said that these community health appraisal forms are being widely used in this country; and the majority of health officers and community officials are convinced that such forms serve a useful purpose.

As a matter of fact, over 200 communities now are enrolled in annual Health Conservation Contests, sponsored by the United States Chamber of Commerce, for which the Committee on Administrative Practice of the American Public Health Association is furnishing expert direction. Awards are made on the basis of scores attained following the use of these health appraisal forms.

### The Need for Measurement

WHILE the end results of industrial health work, involving qualitative factors, are difficult to evaluate, and must always be looked upon as more or less intangible, may not industrial leaders begin quantitatively to measure and appraise their efforts in this all-important field? Much is heard these days of "balancing the budget". May we not balance the health program in industry, as well as strike a balance between program and actual performance?

One of the most important requirements at the present time for the further development and administration of industrial health services is a plan of method for the measurement and appraisal of these activities. Such a plan would serve not only to evaluate but actually to promote industrial health services. While many industrial organizations have well-organized programs, much remains to be done by other companies in the development of a complete program.

### Form for Industrial Health Service

THE MEASUREMENT of an industrial health program, including safety activities, from the viewpoint of total performance or company efforts presupposes and suggests the development of a special appraisal form for industrial health service.

The purpose of such a proposed measuring device at the moment is not to determine the quality or ultimate effectiveness of industrial health activities,

| SECTIONS AND SUBDIVISIONS | Value of Item |
|---|---|
| A. Vital Statistics Activities | 75 |
| 1. Death Records | 2 |
| 2. Tabulation of Death Statistics | 2 |
| 3. Sickness and Accident Records | 7 |
| 4. Tabulation of Sickness and Accident Statistics | 9 |
| 5. Interpretation and Use of Statistics | 55 |
| B. Communicable Disease Control | 150 |
| 6. Records and Case Investigation | 15 |
| 7. Immunization | 50 |
| 8. Special Preventive Measures | 70 |
| 9. Public Relations | 15 |
| C. Tuberculosis Control | 100 |
| 10. Case Finding | 17 |
| 11. Medical Service | 25 |
| 12. Field Visiting | 23 |
| 13. Institutional Care | 35 |
| D. Occupational Disease and Accident Control | 200 |
| 14. Records, Case Investigations and Reports | 30 |
| 15. Medical Examinations | 50 |
| 16. Employees Brought to Professional Attention | 30 |
| 17. Laws and Regulations | 20 |
| 18. Inspection | 40 |
| 19. Education | 30 |
| E. Personal and Environmental Hygiene of Office, Shop (Store), Factory and Outdoor Field Workers | 400 |
| 20. Daily Inspection | 10 |
| 21. Periodic Inspection | 10 |
| 22. Field Visits | 25 |
| 23. Medical Examinations | 100 |
| 24. Employees Brought to Professional Attention | 50 |
| 25. Sanitation of Headquarters, Branch Office Buildings, Shops (Stores), Factories and Outdoor Working Environment | 100 |
| 26. Food and Milk Control | 25 |
| 27. Health and Safety Education | 60 |
| 28. Recreation and Rest Periods | 20 |
| F. General Health Publicity | 75 |
| 29. Articles in Company Magazines | 35 |
| 30. Health Bulletins and Reports | 15 |
| 31. Health Posters and Movies | 20 |
| 32. Special Health Publicity Activities | 5 |
| Maximum Total Score | 1000 |

* See complete detailed form for scoring purposes.

**Table 1. Brief Summary of Sections, Subdivisions and Assigned Values of Proposed Health Appraisal Form for Larger Industries**

but rather to show the extent and quantity of such work and to serve as an objective measurement to be used by business executives and personnel representatives in the inspection, appraisal or scoring of their own health activities, and the comparison and checking of the same from year to year. Indirectly, quality of work also is measured to a considerable degree. While such a rating schedule as suggested may be used in fostering the competitive spirit in health matters between various comparable units in a company, the chief use of such an appraisal form in the immediate future would be as a basis for comparison between what is and what should be in any given company or units.

1. *Objectives.* The objectives sought in the development of an appraisal form for industrial health service are:

(a) To obtain a picture of the extent or degree of organization and development of modern industrial health practice in a company or any unit of the same.

(b) To serve as an instrument to promote, guide, interpret and measure health work in an industry or any of its units.

(c) To arouse interest on the part of all company officials in the need for adequate health service in the industry; and to present those more directly in charge of the management of any unit with a tangible and concrete form of objective.

(d) To provide stimulus for the development of a well-balanced industrial health program, and to supply standard indices by which progress in health work may be followed by company personnel.

2. *Standards.* It should be fully understood that the various criteria, standards and values used must be

| SURVEY | APPRAISAL | Value of Item | Vaue Assigned |
|---|---|---|---|
| D. Occupational Disease and Accident Control | D. Occupational Diseases and Accident Control (200) | | |
| 14. Records, Case Investigations and Reports | 14. Records, Case Investigations and Reports (30) | | |
| a. Are individual case records and investigations made of the more important occupational diseases, poisonings and accidents if and when present? | a. Complete investigation of each case of occupational disease, poisoning or accident. | 10 | |
| b. Are these records filed in a ledger or card file? Are name, address, date and diseases or accident given? | b. Records giving name, address, date and disease or accident, filed in a ledger or card file | 10 | |
| c. Are the essential facts of each case correlated with other information as to possible source or cause including vocational hazards and industrial poisons? | c. Essential facts of each case correlated with information as to possible source or cause | 6 | |
| d. Are all occupational diseases, poisonings and accidents reported to public authorities if and when required? | d. All cases reported to public health authorities as required | 4 | |
| 15. Medical Examination | 15. Medical Examination (50) | | |
| a. Are periodic medical examinations made of all employees whose work involves special hazards? | a. All employees exposed to special occupational hazards given a periodic medical examination | 30 | |
| b. Is an accurate record kept of number of employees found during year with beginning evidence of occupational disease or poisoning? | b. Count 20 for an accurate record of number of employees showing evidence of occupational disease or poisoning | 20 | |
| 16. Employees Brought to Professional Attention | 16. Employees Brought to Professional Attention (30) | | |
| a. Number of employees brought to immediate professional attention during the year regarding treatment of reported occupational disease, poisoning or accident, if and when present, To company physician To other physician | a. Count 30 for at least 75% of all employees who showed evidence of occupational disease, poisoning or accident, brought immediately to professional attention during the year for adequate treatment. Quota Performance | 30 | |
| 17. Laws and Regulations | 17. Laws and Regulations (20) | | |
| a. Are all public laws and company regulations pertaining to hygienic working conditions, protection of the worker, safetv devices, and compensation, complied with? | a. Count 20 if all laws and company regulations were complied with | 20 | |
| 18. Inspection | 18. Inspection (40) | | |
| a. Is periodic inspection made of all places of work to protect employees against preventable diseases, poisonings and accidents of occupation? | a. Count 40 if regular periodic inspections of factories and shops, to protect employees against occupational diseases, poisonings and accidents, were made last year | 40 | |
| 19. Education | 19. Education (30) | | |
| a. Number of employees who have received special instruction or directions during the year on the causes of and methods of protection against occupational diseases, accidents or poisonings. | a. Count 30 for at least 95% of all employees exposed to occupational diseases, accidents or poisonings who had special instruction on the causes and methods of prevention of the same during year. Quota Performance | 30 | |

**Table 2. Sample of Detailed Form Showing Section D. of Table 1**

revised from time to time as conditions and practices change; but such changes should not be too rapid nor radical; otherwise it will become difficult to compare progress from year to year.

In general, the standards adopted for this appraisal form are far from being ideal, but have been set as high as practicable. The form is in the nature of a scoring booklet and contains numerical values assigned to various activities in the industrial health-promotion field. The rating for each activity is based partly on the health promotional value of each item in question, but more especially on the need for further development in industry of particular activities noted.

3. *Contents of Form.* The form consists of various sections and subdivisions with their assigned values, as shown in Tables 1 and 2. In the form itself, not possible in this condensed paper, each of the subdivisions is further divided into various items or criteria which measure the amount of performance or frequency of practice, both of which are adapted to rather strict, impersonal quantitative measurement and can be assigned a definite quantitative number and value. To a lesser extent some of the activities are standard procedures which cannot be scored down; they either are or are not routinely performed and can have only a fixed number and value and given a full score or nothing. To arrive at a total score for a company, or any unit being appraised, the major section totals are added after each one of the sub-items has been determined and added. At the end of the form has been included an "Appraisal Summary"

Name of Company: _____ Address: _____

Character of Work: _____ Number of Employees: _____ Date: _____

Are Health Services Rendered by Company Itself, by Community Agency or by Private Physicians? _____

| | Value of Item | Value Assigned |
|---|---|---|
| A. Death, Sickness and Accident Records (15) | | |
| 1. Records kept of all cases of death, sickness or accident among employees | 5 | |
| 2. Records used as guide to possible preventive measures | 10 | |
| B. Sickness and Accident Prevention Measures (30) | | |
| 3. All cases of disease, poisoning and accident among employees carefully investigated as to possible source and further spread, including particularly communicable diseases, tuberculosis and occupational diseases and accidents | 7 | |
| 4. A periodic sanitary inspection or survey made of all places of work to protect employees against preventable diseases, poisonings and accidents, and such places under constant supervision | 7 | |
| 5. All matters pertaining to proper ventilation, heating, lighting, seating, etc., under constant supervision | 6 | |
| 6. Measures taken to encourage employees to have specific protection such as vaccination against smallpox, and immunization against typhoid and diphtheria | 3 | |
| 7. Adequate guards and safety devices in use for the protection of the workers against accidents | 5 | |
| 8. Employees who have been absent from work on account of communicable diseases examined before return to work | 2 | |
| C. Personal Health Promotion (40) | | |
| 9. New employees given physical inspection or examination and records kept | 10 | |
| Inspection by lay attendant 1 point | | |
| Inspection by physician 5 points | | |
| Examination by physician 10 points | | |
| 10. Employees encouraged to have periodic physical examinations | 5 | |
| 11. Adequate follow-up to insure highest possible number of corrections of defects and abnormal conditions found | 2 | |
| 12. Group supervisors encouraged to watch for signs of abnormal conditions among employees, and to refer them promptly to medical attention | 3 | |
| 13. Complete supervision of all occupational injuries, including records and follow-up | 5 | |
| 14. All cases of sickness and occupational injuries sufficiently supervised to assure adequate medical, surgical and nursing attention | 5 | |
| 15. A regular program maintained for the education of employees on matters pertaining to health | 10 | |
| D. Public Relations (15) | | |
| 16. Board of Health regulations complied with by employees and management so far as known; and all cases of communicable and occupational diseases reported to public authorities if and when required | 10 | |
| 17. Federal and State laws and regulations pertaining to hygienic working conditions, protection of the workers, safety devices and compensation, complied with | 10 | |
| TOTAL | 105 | |

**Table 3. Sections, Subdivisions and Assigned Values of Proposed Health Appraisal Form for Smaller Industries and Business Concerns**

item by item, covering section and grand totals to be used for final scoring. More detailed instructions will be found in the form itself under "General Directions for Use of the Industrial Health Appraisal Form."

4. *Survey Questionnaire.* Combined with the Appraisal Form is a suitable schedule or questionnaire for obtaining in proper sequence the fundamental data necessary and required for an intelligent appraisal of company health work. Thus the left-hand pages of the form are given over to the so-called survey containing questions and precise information in order that definite scoring can be made. On the right-hand pages the "Appraisal Form" itself is given, opposite the corresponding items in the "Survey Schedule," showing the standard values for the various items and containing columns for putting down the assigned scores. If it is desired not to use the right-hand page appraisal sheets, the left-hand pages may serve at least as an outline of a well-rounded program.

5. *Collection of Data.* It is assumed that it probably will take considerable time for personnel representatives or other officials of industrial companies to fill out the suggested form, at least for the first time. Much of the information called for may never have been brought together under one head, by one department or person. Reference to and assistance from various departments and officials in a company may be required before the data can be assembled completely. When once the information and material have been brought together in concise form, and the "machinery" set up for gathering similar data from year to year, the task of periodic appraisal of company health activities and facilities should be fairly brief and simple.

6. *Directions for Use.* In instances where questions call for records, the figures for the last year during which accurate data are available should be given. So far as possible questions should be answered and credits assigned on the basis of exact information obtained from department records rather than through the opinions or statements of department personnel. Except in cases in which items for appraisal are given a graduate scale of credits on the form, the person making the appraisal should apportion the assigned credits on the basis of a uniform rate of increase from zero to the maximum. Further detailed directions may be found in the form itself.

7. *Miscellaneous and Supplementary Data.* Under this heading the following items of general interest, while not included for specific scoring or appraisal, are included in the detailed form:— General Information; Employee Census and Working Time; Death Rates; Sickness Rates; Accident Rates; Medical Department Administration and Services (if any); Financial Expenditures for Health Services and for Sickness and Accidents.

## Form for Smaller Industries

A SIMPLE, brief health appraisal form for smaller industries and business concerns is given in Table 3. It is intended to measure efforts and performance in a very general way, and does not, at this early stage of development, attempt to stress too much the actual quantitative services rendered; it is only a suggestion for a beginning. In using this abbreviated and simplified form at the outset, representatives of smaller industries or business concerns should become thoroughly familiar with the details of the form for larger industries, and set their own goals and objectives accordingly.

## Group Study of Plan and Form

IT IS CERTAIN that each person who studies these proposed appraisal forms for industrial health service will differ somewhat in his opinion as to the relative values assigned to the different sections and subdivisions, based, naturally, on his own experience and on the character and conditions of the industry with which he is associated. Therefore, the matter in its final official form cannot be based on the opinions of one individual, and the writer is seeking to obtain group judgment on the part of experts in both the general personnel and industrial health fields.

Members of the Personnel Division of the American Management Association may be able to render a distinct service to the advantage of health service in industry by making use of these tentative and preliminary forms for trial study and experimentation during the coming year. After a sufficient time has elapsed, it then will be desirable to go over the suggestions and criticisms of those who have put the forms into practical experimental use, and in the light of their experience, to revise and standardize such forms on the basis of group judgment.

The American Public Health Association has appointed a committee to study and follow the experimental use of the preliminary appraisal form for industrial health service. This committee, of which the writer is chairman, will be glad to receive suggestions and recommendations from those who may have any practical experience in the use of the form. On the basis of such group experience it is hoped that the form later may be revised, standardized and officially adopted.

1. *Experimental Trial.* This survey and appraisal form for industrial health service has been used on a preliminary trial basis by one statewide industrial organization employing about 4,000 people, and the vice president in charge of personnel and public rela-

tions of this company makes the following comments:

"I like the plan immensely. It advances our health program and medical supervision very materially. In giving us a chart to guide this activity, we can plan our work with confidence and definiteness, confining our major effort to administration."

He states further:

"The major advantages of this appraisal plan in our company are:

(a) The establishment of definite and complete programs of the essential health activities.

(b) Accurate knowledge as to how thoroughly these activities are being administered.

(c) Stimulation of a keen interest in health activities throughout the entire personnel and a sustaining of that interest. We need greater health consciousness.

(d) It provides the background and material for periodic discussions, bulletins and articles in our company magazine on health subjects.

(e) It is a better measure of our health situation than the present method of comparing the number of cases of sickness and the days lost for this reason.

(f) Over a period of years, it should aid in the reduction of the amount of sickness and the resultant costs to a greater extent than other plans which have been utilized to date. The appraisal points out clearly the weaker spots in the health program which permits concentration of effort on such items.

(g) The personnel engaged directly with health activities and medical supervising will derive a greater degree of satisfaction from their work under this scientific plan."

In closing, the writer respectfully suggests that the Personnel Division of the American Management Association consider the possible desirability of creating a committee to cooperate with the Committee of the American Public Health Association in fostering and guiding the health appraisal plan in industry.

## Discussion

*By* Dr. Otto P. Geier

*Cincinnati Milling Machine Company*

BEFORE entering upon a discussion of what should be contained in a health appraisal of industry, we should have in our minds some broad concept of the thing to be measured, some fairly definite idea of the character and extent of a good medical service with its many ramifications, so that the particular industry, measuring itself, may have placed before it the various factors that it can and should obtain in a good health service. Perhaps I may be pardoned, therefore, for rather boldly attempting to throw upon the screen some of the elements that compose medical service in industry.

I came into industrial medicine during its horse-and-buggy stage. Viewed from a wide perspective, and excluding, perhaps, the large industries, industrial medicine is still in the "Model T" stage. It does not have self-starting features, nor free-wheeling; it has no shock absorbers; no automatic clutch on management. These departments have therefore felt the bump of the depression very seriously, have suffered acutely from rough riding. I was privileged to be one of the progenitors of the Health Service Section of the National Safety Council in 1914, and was its first chairman in 1915. I was also accoucheur at the birth of the American Association of Industrial Physicians and Surgeons. As Chairman of the Section on Preventive Medicine of the American Medical Association, I brought this subject the next year to the attention of the members of that section, who later hyphenized the name of their section with that of industrial medicine. I took part at Washington, during the war, in the wordy battle of the American Federation of Labor against physical examinations in industry. I rode through and survived the minor depression of 1921, and I am now seeing the life struggle of medical service in industry in this world-wide depression. So I am naturally interested that any measure of its growth be carefully conceived.

Most such medical services have been born in the need for surgical care in compensation cases. Physical selection of employees was originally also a part of a defense program. Industrial medicine as an offensive against disease and accident, as a factor in preventive surgery, has usually developed only where some upstanding, socially-minded physician impressed management with the potential industrial relations values and financial values of a high-grade medical service. When this does not happen it degenerates into a pill-shooting, iodin-dabbing, finger-wrapping first aid station. But even in such cases it may appear in the organization chart and be proudly talked of to visitors by the management, might even be highly graded in a health appraisal.

IN A REAL department, preventive medicine obtains, and is largely instituted with individuals as contacts are made in the industrial dispensary for curative purposes or when physical disability is noted as the employee is being attended for an accident. Such a department also provides opportunity for preventive surgery, or a type of reparative surgery that avoids unnecessary removal of fingers and other parts, that prevents painful stumps, that prevents loss of joint motion, and that promptly institutes rehabilitation on the job. With careful surgical procedure promptly applied, few of those infections develop which cost industry so much when accidents are cared for by the

too frequently untrained neighborhood practitioners.

Such a department teaches the use of simple home remedies. It insists that men be kept off the job whenever the conditions indicate, even against the employee and employer's wishes. On the other hand, it realizes that major operations had best be done at hospitals. It induces the use of the better type of physicians and surgeons for the employee and his family. It acts as a medical clearing house for employees. It is willing to listen to family medical and social problems and give advice thereon.

A good industrial physician uses the occurrences of his dispensary to develop the far-seeing eye that suspects the source of skin diseases and infections. He investigates the cutting compounds and chemicals for possible causes. He traces possible hazards of dust, etc., when faced with bronchitis or tuberculosis. He is continually on the lookout for focal lesions as a basis for the recurring minor complaints, that rarely go to a family physician but which do appear at the dispensary—too often these reach treatment after disease has advanced beyond recovery. Such a department does not limit itself to the physical examinations made at the periodic health reviews. It uses a part-or whole-time dentist for prophylaxis and extractions, and encourages thereby the use of good dentistry on the outside. It is the business of an industrial physician to note the quality of medical service rendered the employee during illness by carefully reviewing the weekly reports of the family physician to the "Mutual Aid," to institute, as a function of the plant sickness fund, preventive measures against unnecessary prolongation of illness by offering to the attending physician, at cost of the "Mutual Aid," consultation, x-ray service, blood examinations. It pays an extra day's benefits if the outside physician is consulted on the first day of absence. The department should give the attending physician the benefit of the accumulated plant records of his patient; he should make re-examinations or inspection of the employee after absence from sickness.

Another measure of effectiveness is the per cent of use of the department voluntarily by men in consultation for their more serious afflictions. The use of the department by executives also reflects its real status. If there is a cheap doctor and poor service, executives and men will both shun the department except for emergencies. Proper space, friendly helpfulness, exceeding cleanliness and good light must characterize the dispensary. Its equipment, x-ray, dental and physical-therapeutic elements must be either of the best or none at all. Workmen, far more than is generally believed, judge the business capacity of management and gauge the character and purpose of an industrial relations program quite accurately by what management provides in the matter of health and accident service. It is the one thing that is above and beyond the pay envelope. The medical department grows in stature as the industrial relations program becomes sympathetic and understanding of the workers true problems, and vice versa. Ill health is one of the worker's greatest hazards, and perhaps the costliest. It is costly to management.

Medical service succeeds best when the department reports direct to the president in the smaller organizations and to the vice-president in charge of personnel in the larger companies.

IN THESE days of unemployment another measure of social efficiency is the amount of medical service rendered former employees now out of their jobs, who need and deserve that service even more than those still employed. In the same way the intelligent use of free or partly free social service, medical, hospital and outpatient departments of a city, for observation and diagnostic assistance, etc., is another barometer of the usefulness of the industrial dispensary. It follows also that the greatest use of and cooperation with health department officials is fundamental. The same attitude should be shown to Compensation Commissions in regard to occupational diseases and accidents.

I have already alluded to the important part a real sickness fund may play. If it is no better in its conception or organization than that of the average lodge, if it is poorly financed by inadequate dues, the benefits are bound to be niggardly and negligible. If the benefits cease for the tuberculosis, the cancerous patient or the bad fracture, at the proverbial 10 to 13 weeks period instead of a year, to the employee this also reflects the disinterest or unintelligence of the management. Far better for the employee and the employer that there be no plant medical service, no "Mutual Aid," rather than an inadequacy in either case.

FINALLY the eternal question—does it pay?—will determine whether health service in industry is to make much progress. Perhaps the usual dollar measure is not sufficiently accurate to strike a balance in the budget. A critical analysis, however, will divulge real financial returns.

It must have been some satisfaction to the management of one of the relatively small industries, whose dispensary cared for 40,000 medical and surgical visits in 1929, to learn that, compared with the severity and frequency rates occurring in a number of similar plants employing some 400,000 employees (as compiled by the National Safety Council), its frequency rate was 13.5% below the average of the group, while its severity rate was 87.5% below the average, and that for the same period the company enjoyed the

lowest possible compensation costs for its classification. Here, then, was an actual measure of the efficiency, the dollars and cents value, of the preventative surgical service of that company. While it is qualitative, it is an example of the difficulty of separating the qualitative from the quantitative.

But the more intangible values, the by-products of these thousands of contacts between the employees and a high-grade medical personnel, can only be properly evaluated by management when it, itself, uses the department; when it sees the constant flow of patients, sees the various services rendered, sees the satisfactions engendered, the reliefs of mind and body afforded.

And as the manager at close range sees this type of mass medicine and surgery at work, where the per case cost is ridiculously low, compared to services procurable by his employees privately, he must realize what an unusual contribution to their living cost he is making for a relatively insignificant expenditure; that he is helping put off the day of state medicine with all of its defects and high costs; that by no cheaper method can he establish such good factors in an industrial relations program.

In this day of political turmoil—the day of the demagogue and the great opportunity for the unthinking but zealous reformer—when all kinds of social panaceas imported from Europe are being offered for legislative action, such as state sickness insurance, old-age pensions, and unemployment insurance, it is fortunate if management is able to show that it has not been idle in its planning for the main hazards of the worker; that it can do these things more economically and better than the state. Let us hope that the workers, from their experience, can also believe this, so that management and men together may strive to keep ill-considered social schemes out of our statutes. The way management has handled its medical departments will weigh heavily in this balance.

The essayist has presented a very extensive outline as a basis for a health appraisal in industry to be made by the personnel, other than medical. He proposes that this should be patterned largely upon such appraisals made of public dairies and restaurants, and in the grading of cities and towns as to their fire defenses. He instances the success of such appraisal forms now broadly in use for community health departments. He claims that such a measurement would not only evaluate but actually also promote industrial health service; that it is not so much to determine the quality or ultimate effectiveness of industrial health activities as rather to show the extent and quantity of such work. For the smaller industries it is intended to measure effort and performance in a very general way, and not attempt to stress too much the actual quality of service rendered; to attempt to "appraise positive physical health practices and defenses against disease rather than to compare and rate units on the basis of sickness and deaths alone or loss of time due to sickness and accident. . . . The purpose of the proposed measuring device is not to determine the quality or ultimate effectiveness of industrial health activities, but rather to show the extent and quantity of such work and to serve as an objective measurement."

NOW AS to the questionnaire. I may be entirely at fault in my belief that this is no time for the type of survey that is here suggested; that industry would be in no mood for this appraisal, and that industry would consider it not sufficiently definite in its promised end results. It is not clear to me that it would justify itself unless somewhat extended into the qualitative field.

I am wondering if Dr. Bristol may not himself believe that industry, just now, rather needs another type of evaluation, a combination of the quantitative with the qualitative type of appraisal.

Were I devising a health appraisal, I would be interested to learn how much of the health activities had survived the depression, what had been detached and what had been kept, and why these things had been done by management. In spite of the depression I would still ask what per cent of the employees were visiting the department each day—what per cent for accidents and what per cent for medical service; whether it was limiting itself to occupational injuries and diseases, or whether the department had seen fit to extend its service to the ex-employees as a social measure. I would still be interested in the frequency and severity rates of accidents, also the percentage of sickness. I would want to know whether malingering, both in accidents and sickness, had not become a real problem, and to what extent it had raised the cost per individual per year during this unemployment period—for the answer to this latter question is involved deeply in the much discussed malingering under unemployment insurance. I would want to know whether physical examination was compulsory and also compulsory upon return after accidents or illness; whether encouraged attendance in the dispensary (as in one company—28.5 visits per year per man in 1929) would not offer more potential protection to the individual than the usual periodic examination.

I fear I have not done what was expected of me, for I have not directly discussed the details of the survey and the methods proposed by Dr. Bristol's paper, but have tried rather to indicate the perspective that we should have in mind before we write our appraisal. I recognize that I have considerably extended the scope of Dr. Bristol's proposal and also that, contrary

to the essayist's purposes, I may, to an extent, have gone beyond the quantitative measure. I do this advisedly, as I feel that it adds strength to the broad purpose in hand, that, if added, the appraisal would be more favorably received, and more stimulating to management, and that in the end it would, therefore, more definitely extend the wider introduction of health work in industry which Dr. Bristol sets down as one of his purposes. Such a plan would serve not only to evaluate but also would actually promote industrial health service.

## Discussion

*By* C. O. SAPPINGTON, M.D., DR. P.H.
*Consultant in Industrial Hygiene, Chicago*

THE TRANSMISSION of biologic observations to precise mathematical statements is always fraught with danger—the difficulty lies in not being able to evaluate mathematically or in precise enough terms the behavior of human beings.

Fortunately, however, Dr. Bristol has avoided the greatest difficulty involved in such a principle, because in this plan the rating is based on practices instead of results.

Most of us are familiar with the unsound methods which prevail in contests between different plants or between departments of the same plant when the figures are based on the principle of lost time. Dr. Bristol has indeed been wise in appraising health activities on positive and preventive practices.

But the author has gone even further and has emphasized that ratings should be made on need for the further development of health activities, rather than on value. This is an unusual conception, but one that is at the same time reasonable and logical.

In repeating some of the advantages of the appraisal method, it should help to *promote* activities as well as evaluate them—to *check* from one year to another the progress made and if found expedient to *compare* such progress with that of other groups.

The survey questionnaire will undoubtedly be of great value as a supplementary procedure in enabling the industrial executive or other person charged with the responsibility, to put the appraisal method into actual practice. It serves as a guide and should not only be followed of and by itself, but should suggest to those who use it other ways and means of applying the rating scale.

One could not be too enthusiastic about the form for smaller industries—often it is the smaller industrial group which appears to have less interest in health activities, seemingly because of the economic outlay involved. Since upward of 95% of the total number of industrial establishments in the country can be called "small groups," the value of including some guiding principles for these organizations is immediately evident.

NEW PROCEDURES like new habits and customs call for adjustment; these adjustments can best be met by following the suggestions that Dr. Bristol has made for the actual study of the results of the application of the appraisal, the pooling of results, the making of recommendations following such comparisons. Revision will undoubtedly be necessary—no form can ever be static—experience obviously will dictate what is necessary in the way of revision.

The extreme difficulty of devising appraisal and rating schemes is evident to anyone who has had even the slightest experience with these methods of measurement. One goes through the various stages of enthusiasm, discouragement, concentration, and finally adjustment before he arrives at something which will actually work.

As an illustration of these points, I should like to quote from an experience which I had several years ago when acting as Medical Director for Montgomery Ward & Company, Pacific Coast Division, in California. A study had previously been made of the physical defects found on employees applying for work. It occurred to me this material might be the basis for devising a numerical grading scale by which employees could be rated in terms of their physical defects. This study was made and published under the title "The Evaluation of Physical Defects Found During Preemployment Examinations," and appeared in the *Journal of Industrial Hygiene* for January, 1929. Perhaps it would be interesting in making a comparison of our experiences to quote verbatim the summary in this article:

"A grading scheme adapted to the assigning of a numerical value to persons possessing physical defects has been devised. The scale has been based on previous findings and adjusted for use in this particular group. The values used have been considered only from the standpoint of the frequency of occurrence of physical defects, no account being taken of severity, persistence, or correctability. Neither have we assayed the relative importance of such factors as working efficiency, sickness, accident occurrence, absenteeism, or health habits.

"A comparison of our results with the results of a similar study in university men shows the occurrence of higher scores in greater numbers among university men.

"The applicability of any such system of numerical grading would probably vary with the type of work in the plant concerned, the age incidence of the per-

sonnel, the sex distribution, and perhaps the geographic location of the business. Local peculiarities would probably necessitate special adjustments. Apparently a standardized scheme would be a difficult possibility.

"The practical value of grading persons in terms of their physical defects is somewhat doubtful. More work must be done and a more careful evaluation of the various complex factors concerned must be accomplished before a scientific basis can be reached. The subject will probably be of sufficient importance in future years, however, to warrant such study and it is hoped that this small experience will be the incentive to more productive efforts."

ANOTHER example which can be cited is a similar study made in the same group as noted above, entitled "The Incidence of Dental Defects in 2,469 Employment Examinations," published in the *Journal of the American Dental Association*, November, 1928. This was a statistical enumeration of the various types of common dental defects occurring by age groups, by sex, and by defect, comparisons being made by percentage distribution in statistical tabulations. Although no attempt was made to assign a numerical grading to each individual, this is the first example to my knowledge of a study listing the various common dental defects in a general group of commercial employees.

Dr. Bristol is to be congratulated in making the initial step in the application of an appraisal method to industrial health activities. The plan is not revolutionary when viewed in its broad aspects, but it will be successful if properly applied, because it is the product of sound thinking.

(Paper and discussions at a meeting of the Personnel Division, American Management Assn., Chicago.)

## Traumatic Hernia

MANY SURGICAL authorities agree that "traumatic hernia" is a rare condition. Nevertheless claimants constantly appear before compensation departments alleging that this condition exists.

Certain industrial groups insist upon a thorough examination of every applicant seeking employment; however, probably some of these cases will continue to arise from time to time.

According to the compensation laws of North Carolina the following facts must be proved to the satisfaction of the industrial commission before it will consider that any hernia is of traumatic origin:

1. That there was an injury resulting in hernia or rupture.
2. That the hernia or rupture appeared suddenly.
3. That it was accompanied by pain.
4. That the hernia or rupture immediately followed an accident.
5. That the hernia or rupture did not exist prior to the accident for which the compensation is claimed.

The foregoing requirements should certainly make any physician cautious in taking the stand that any hernia is of traumatic origin.—*Journal of the Oklahoma State Medical Association.*

## Science and Law

WE MAY NOT expect to have a system of criminal justice far in advance of what the public can and will understand and believe in. We must make the demands of science clear and familiar to the public before we may in deference to science, tear down much to which men are accustomed and build up that which is new.

When science is itself in a state of flux, when new discoveries, new theories, new methods are set up before us day by day, it is increasingly difficult to make an adjustment of legal conceptions and legal institutions and legal practices to scientific knowledge for the time being which will at once be intrinsically sound and commend itself to public understanding.—Dean Roscoe Pound, quoted by Dr. George S. Johnson, in *A. M. A. Journal.*

## Problem in Medical Care

THE FOLLOWING plan has been proposed in summary regarding the solution of the problem of readjusting the care of the indigent patient:

1. *Equalization.* Laboratory service and medicine to be provided by public funds for indigent patients impartially, whether cared for by private practitioners or public clinics.
2. *Investigation.* Indigent patients in order to obtain free laboratory service and medicine must procure a card from an authorized investigator.
3. *Registration.* Before free laboratory service and medicine can be obtained, the physician's name, the patient's name and address, and other data must be given to the secretary of the Wayne County Medical Society to be put in the register, and only patients of physicians in good standing will be allowed free laboratory service and medicine.

The author of this plan, Dr. James A. MacMillan, of Detroit, believes that it would form the basis of a uniform, equitable and economic system that could be readily adjusted to meet conditions as they arise and it would not only safeguard the interests of the medical profession, but would also be advantageous to patients and to the public.—*Bulletin of the Wayne County Medical Society.*

# Subjects in Industrial Hygiene

*—An Attempt to Discover Differences or Trends in Interest Through a Brief Survey of the Literature of the Years 1925 and 1932—*

FROM an experience in surveying and studying the literature of industrial hygiene during various intervals of time, and in investigating certain specific subjects, the idea developed that some conclusions of value indicating the trend in importance and interest might be gained by comparing the subjects of original articles during the years 1925 and 1932.

The former year was selected because journals and magazines were not available beyond that period in the files of the American Medical Association. It was also believed that some indication of the relative importance of different subjects could be gained for the use of industrial physicians, executives, and others who might wish to know whether there was any trend and also what the differences in interest were during these two periods. It is acknowledged that editorial selection plays a considerable part in the emphasis on subjects on which material is published; nevertheless, it is believed that this factor may be discounted, for in general, editors keep informed as to the importance and relative trend, as well as the timeliness of any given article.

Accordingly, three magazines were selected—the *Journal of Industrial Hygiene,* the *American Journal of Public Health,* and the *Journal of the American Medical Association,* since these publications carry the majority of the material which is published on the subject of industrial hygiene and medicine. The first two publications mentioned are printed each month; the latter is a weekly journal.

No attempt was made to list purely surgical subjects or even those relating to industrial surgery alone, since the volume of such articles is so great and the number of publications so considerable, that great difficulty would be encountered.

**Journal of Industrial Hygiene**

THE FOLLOWING subjects formed the basis for the publication of material in the *Journal of Industrial Hygiene* during the year 1925:

Relation of Organic Dust to Pneumonokoniosis.

Industrial Poisoning by Arseniureted Hydrogen (Arsine).

Behavior Studies in Industry.

Vital Capacity of the Lungs and Its Practical Application.

Industrial Hygiene in Moscow.

Opportunities for Industrial Service in a General Hospital.

Anatomical Distribution of Occupational Cancers.

Examination of the Heart in Industry.

Toxicity of Hydrogen Sulphide.

Observations in Blast-Furnace Gassings.

Industrial Poisoning by Inhalation.

A Contribution to the Study of Punctate Basophilia in Lead Workers.

Photography and the Measurement of Fine Particles.

Atmospheric Conditions in Laundries.

Manufacture of Tin Plates—Comparison of Old and New Tinning Processes.

Lighting in the Industries.

Engineering-Hygienic Aspects of Dust Elimination in Mines.

The Unhealthy Bargee.

Two Years of Industrial Ophthalmology at the Pullman Car Works.

Recommendations for the Control of Health Hazards in Garages and Auto Repair Shops.

Determination of Suspensoids by Alternating-Current Precipitators.

Determination of Small Amounts of Zinc of Organic Nature—A Microchemical Method.

Acute Dermatitis Among Painters Employed in Industrial Plants.

42 Occupational Disease Hazards in One Industry —An Example of Multiple Hazards in Industry.

Size—Frequency and Identification of Phagocytized Dusts.

Effect of Atmospheric Conditions on Health and Efficiency (Cotton Industry).

Dust Hazards in the Abrasive Industry.

An Improved Form of Dust Sampler.

Recovery of Small Amounts of Zinc from Biological Material.

Necrosis of the Jaw in Workers Applying Luminous Paint Containing Radium.

A Method for Sampling Dust in Alveolar Air.

A Study of Back Strains.

Researches in Mental Hygiene in Industry.

Statistics, Definition, and Clinical Aspects of Occupational and Industrial Dermatitides.

Impressions of a Visit to the United States (by a Member of the British Industrial Fatigue Research Board).

An Effective Method for Conducting Experiments on Dust Inhalation.

Skin Diseases in Reference to Industrial Application.

Manufacturing and Repair of Electrical Accumulators.

Rural and Urban Health—a Comparison.

Factory and Shop Legislation in Australia.

Calcium and Tuberculosis—The Influence of Inspired Dust on a Specific Infection.

The Efficiency of Oxygen-Carbon Dioxide Treatment for Carbon Monoxide Poisoning.

The Human Side of How to Do It Best.

Photometric Methods for Studying and Estimating Suspensions of Dusts, Fumes, and Smoke. DURING 1932, the following subjects were used in original articles in the *Journal of Industrial Hygiene:*

Hydrocyanic Acid Gas Poisoning by Absorption through the Skin.

Normal Sensitivity of the Cardio-Inhibitory Center.

Studies on Experimental Pneumonokoniosis (Inhalation of Quartz Dust).

The Baltimore Gas Appliance Ordinance and Its Relation to Public Health.

Pressure Chamber Installation for the Study of Physiological Effects of Pressures Varying from six to 60 Pounds per square inch Absolute.

Control of Silica Hazards in the Hard Rock Industries (Investigation of the Kelley Dust Trap).

Modern Problems in Industrial Medicine.

Recent Research into Causes of Industrial Accidents.

Factors in the Production of Nervous Lesions following Electric Shocks.

Measurement of Radiant Heat in Relation to Human Comfort.

Effects of Prolonged Exposure to Sulphur Dioxide.

Reaction of the Organism to Repeated Electric Shocks.

Results of Supplementing the Dietary of Substandard Workers with Cod Liver Oil and Milk.

Toxicology of the Carbonyls.

Erysipeloid—A Disease of Industry.

Occurrence of Boils among Men Working in Coal Mines.

Control of Silica Hazards in Hard Rock Industries (Design and Operation of Dust Control Systems).

Cutaneous Papillomas among Patent Fuel Workers in Relation to Malignant Disease.

Chronic Poisoning by Oxalic Acid.

Asphyxia from an Unexpected Cause.

Carbon Monoxide Survey in the Liberty Tubes, Pittsburgh.

A Modified Form of the Greenburg-Smith Impinger for Field Use.

Problem of Possible Health Hazards of Lead-Weighted Silk Fabrics.

Determination of a Single Index of Atmospheric Conditions in Relation to Physiological Effects.

Quantitative Determination of Fine Soot Inhaled by Man.

The Pneumonia Problem in the Steel Industry.

Alternating-Current Precipitators for Sanitary Air Analysis.

**American Journal of Public Health**

DURING 1925 the list of subjects relating especially to industrial hygiene as presented in the *American Journal of Public Health* were as follows:

Role of the Federal Government in Promoting Industrial Hygiene.

Medical and Nursing Service in Industrial Plants.

A Future Development in Industrial Hygiene.

Values in the Maintenance of the Health of the Worker.

Industrial Health Promotion in Small Plants.

Relation of Public Health Workers to Industrial Hygiene.

Promotion of Industrial Hygiene.

Industrial Hygiene by Employers' Organizations.

Role of the State in Industrial Hygiene.

Industrial Morbidity Statistics.

Tetra-Ethyl Lead and the Public Health.

THE FOLLOWING list of subjects formed the basis for original articles in the *American Journal of Public Health* during the year 1932:

Antiseptics and Disinfectants and Related Words.

An Appraisal Form for Industrial Health Service.

Significance of Bone Trabeculae in the Treatment of Lead Poisoning.

Medical Service of the Canadian Bell Telephone Company.

Incidence of Tuberculosis in the Industrial Population.

Greenburg-Smith Impinger for Sampling Fumes, Smokes, Gases, and Dusts.

Observations and Studies on Silicosis by Diatomaceous Silica.

Relative Pneumonia Fatality among Surface Workers and Miners.

**Journal of the American Medical Association**

SINCE this journal is printed each week, a survey was made of the indices of issues from January to June of 1925 and January to June of 1932. The following subjects were taken from issues of the *Journal of the American Medical Association* during January to June of 1925:

Fruit Dermatitis and Paronychia.

Shoe Dye Poisoning.

Tetra-Ethyl Lead.

DURING January to June, 1932, the following subjects occurred:

Industrial Dermatitis from Lettuce.

Silicosis from the Manufacture of Scouring Soaps.

Economics of Industrial Medicine.

Mutual Benefit Associations and Trade Unions.
Coronary Artery Disease in Working Classes.

**Discussion**

IT IS understood that this brief survey does not include abstracts of the literature which are pertinent, and which occurred in each one of these publications during this period of time; reference is made only to original articles.

It would probably be unfair to make a comparison of the subjects listed in the various journals, because each one of them is a different type of publication—the *Journal of Industrial Hygiene* being the only publication devoted exclusively to its subject—the *American Journal of Public Health* reflecting the developments in this broad field—and, finally, the *Journal of the American Medical Association* being a publication of general appeal to the entire medical profession.

However, comparisons can be made between the subjects of articles in the two separated years in each journal.

In the *Journal of Industrial Hygiene* it is apparent that some subjects, such as dust problems and certain poisons, have carried through from 1925 to 1932. It can also be observed that in the later editions as compared with the former a consideration of new problems is evident; this is particularly true in regard to subjects relating to toxicology. It is also apparent that the titles are becoming more specific and less general.

In the *American Journal of Public Health* the comparison is more easily made on account of there being less material. In 1925 there was greater interest in subjects centering about the problems of industrial health administration; in contrast, during 1932 the subjects were more technical in aspect, as well as more specific.

The material printed in the *Journal of the American Medical Association* (original articles) is not sufficient to admit of any definite comparison in the years 1925 and 1932.

In conclusion, it is doubtful if any specific statements can be made concerning the differences of the subjects of industrial hygiene papers printed in the years 1925 and 1932 in representative journals carrying this material. Beyond the carrying over of subjects concerning the major problems in industrial hygiene and the appearance of new and more technical titles, as would be expected, there are no apparent changes indicated by the subjects of the material presented. There is, therefore, no definite trend observable in this brief survey; in order to establish any trend or change it would probably be necessary to make comparisons of the material printed in two more widely separated years, and perhaps occurring in greater periods of time.

## "Doctor"

ALTHOUGH it is far from the thoughts of the medical profession to claim a monopoly on the use of the title of "Doctor," the public is becoming confused because of the numerical increase in recent years of persons of various vocations who have seen fit to use the prefix "Doctor" to their names.

The suggestion has recently been made in the Bulletin of the Wayne County Medical Society (Detroit) as follows: "The term 'doctor' is so widely applied that a diminishing dignity and prestige seems to reward those who affix it to their names. So common has the title become that those who have a proper right to it are finding it necessary to use their academic degrees to avoid confusion.

"Webster defines the word 'doctor' as '(1) teacher, one skilled in a profession, or branch of knowledge; a learned man; (2) an academic title, originally implying that a possessor of it is so well versed in a department of knowledge as to be qualified to teach; (3) one duly licensed to practice medicine; a member of the medical profession; a physician; a surgeon; (4) a repairer of anything.' . . .

"Rare indeed is the gathering of even small size that does not sport at least one individual who answers to the title of 'Doc.' It makes little difference whether he is a D.C., D.O., D.Ch. or a D.F., he's a doctor and the world, though often times reluctantly, accords him respect. . . .

"In the case of the physician, M.D. should be used after the name on professional cards and signs and on scientific papers as a designation that the writer possesses a medical degree and is something more than a 'repairer of anything.' "—Editorial, *Ohio State Medical Journal.*

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## Applied Mental Hygiene

NOW THE ETIOLOGY of mental trouble is by no means a sealed book. Often times we cannot put our finger on the exciting cause, yet we believe the following to be the most frequent causative factors, namely: physical diseases, infectious and otherwise; inherited neurological taints and trends; syphilis; deprivation associated with overstrain, overwork and overworry; alcohol and drugs; senility and arteriosclerosis, and unhappy childhoods filled with repressed ideas, pushed into the subconscious, later appearing as painful complexes. Prevent these causes and overnight you cast the mental gloom from the earth.

Nothing can go further in preventing these six potential life wreckers than properly applied mental hygiene.—Drs. J. J. Gable and J. L. Day, in *Journal of the Oklahoma State Medical Association.*

# Following Up Physical Defects

*—A Practical Technique for Checking and Final Disposition of Physical Impairments in Industrial Employees—*

*by*

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THE VALUE of an adequate follow-up of medical and surgical conditions is gradually being appreciated by the profession. In industry the physical impairments disclosed during preemployment and periodic health or other examinations have made some system of follow-up a necessity. At the present time, because of economic conditions, comparatively few examinations are being made of applicants for employment. Opportunities for reexamination of old employees are correspondingly increased. In view of this situation it has seemed to the writer that an outline of the follow-up system used in the medical department of the Eastman Kodak Company might be of interest.

**Source of Cases**

SINCE 1914 the company has required a physical examination of applicants for employment, and during the past few years, a reexamination of employees returning to work following a lay-off. This reexamination applies only to employees who have not been examined within a year since their lay-off. Employees transferred from one plant to another are examined at the time of transfer.

A general reexamination of all employees was made in 1922 in three of the plants, and in one plant in 1931. Annual examinations of executives, food handlers, and other special groups are made. The physical impairments discovered in these examinations have formed the basis for follow-up work. The examination of employees reporting sick to the medical department and of those returning to work following illness have furnished additional conditions for re-checking.

It is necessary at this point to define the coverage of a follow-up examination. Such an examination is confined, as a rule, to single or multiple conditions discovered at a previous general physical examination, such as the preemployment examination. It, in a measure, provides a substitute for an annual periodic health examination when the latter is not possible or considered necessary. It is applied to cases where the physician feels there is urgency for action. The seriousness of the impairment and the intelligence and cooperativeness of the employee determine the interval between such check-ups.

Properly to advise and direct employees having these impairments is a many-sided and interesting problem.

With certain exceptions employees are ordinarily referred to their family physicians or dentists. During the past three years of economic depression, a considerable number of employees have not been financially able to follow this advice. There were, in these instances, two alternatives—either to refer them to hospital dispensaries or treat them in our own medical department.

When our facilities for diagnosis and treatment appeared adequate and a visit to the dispensary meant loss of time and expense to the employee we have assumed responsibility for care. In each instance, however, it has been distinctly understood that should home visits become necessary a city physician would have to be called.

**Technique of Follow-Up**

WHENEVER the physician, in the course of an examination, preemployment or otherwise, finds certain conditions which he wishes to be followed up, he indicates at a designated point in the record that the employee is to be called back at a specified interval (usually one, two, three, four, six, 12 months) and lists the conditions to be reexamined. The filing clerk notes this request and makes out a "tickler" (see illustration) containing the same information with the physician's name added. These ticklers are kept in a separate file which is divided into 12 compartments, one for each month of the year. The ticklers in each compartment are arranged chronologically. At the beginning of a week the ticklers calling for examinations during that week are taken out and submitted to the physician interested before the employees are sent for. Sometimes intervening visits may have made follow-up unnecessary or postponement desirable.

**Selection of Cases**

IN SELECTION of conditions for follow-up each physician exercises his own judgment. In general, those conditions apt to cause little discomfort to the employee until far advanced are given special emphasis. This includes the so-called degenerative diseases affecting the heart, blood vessels and kidneys.

No systematic attempt is made to follow up conditions resulting in absenteeism, although many of them are included.

The following list arranged under general headings is purely arbitrary. It includes the majority of impairments now being followed either as single entities or in combination.

**Conditions Considered Important for Follow-Up**

ORGANS OF SPECIAL SENSE:

(a) Ears: Impacted cerumen. This common condition usually causes little inconvenience or noticeable defect in hearing until water (from swimming or a bath) enters the affected ear, causing the canal to be sealed over with cerumen. Individuals with an excessive secretion of cerumen in the ears are examined and if necessary irrigated every six months.

(b) Eyes: Visual errors are discovered principally during preemployment examinations. Employees having such errors are referred to the company oculist for correction.

2. TEETH AND TONSILS:

(a) Teeth: Advice is given by the physician and nurse regarding dental defects. The nurse does the major part of the follow-up work. The company does not employ a regular dentist but during part of the year affords opportunity for extractions to those who cannot afford outside treatment. A large number of employees are listed for the annual cleaning of teeth by dental hygienists of the Rochester Dental Dispensary, a gift to the city by Mr. Eastman. This latter work is carried on within the factory and causes very little lost time to the employee.

Dr.....Your Attention is called to The Following

| | | MONTH | DAY | YEAR |
|---|---|---|---|---|
| | John Smith | | | |
| | Camera Works | | | |
| | (Check dental | | | |
| | caries) | 8 | 3 | 33 |

When This Has Been Attended to Please Report to.....

..... Signed .....

T k e:

(b) Tonsils: Employees with diseased tonsils are urged to have them removed and a follow-up instituted to secure the carrying out of this measure.

3. DISORDERS OF NUTRITION: Employees who are considerably overweight, underweight, or malnourished are given printed food guides and advice by the examining physician, and either followed up by him, the nutrition adviser, or a nurse.

4. DISORDERS OF METABOLISM: Where glycosuria occurs the urine is further examined to see if a true diabetes exists. If a blood sugar is deemed necessary the employee is referred to his family physician, or to a dispensary. Known diabetics are interviewed and their urine tested periodically as a check on outside treatment. We find this group prone to become careless regarding diets and examination of the urine.

5. DISEASES OF THE RESPIRATORY SYSTEM:

(a) Colds: For several years a follow-up has been made of a number of employees in the cold-susceptible group. This group has been divided into subgroups—some receiving preventive inoculations of commercial "cold vaccines," others exposures to ultra violet rays, or both. The nutrition adviser has under her supervision a large number of employees susceptible to colds. These employees are served cod liver oil once or twice a day. A weekly record regarding weight and the occurrence of colds is kept. The same record is kept of a control group not receiving cod liver oil. Those employees developing colds in the control group are followed up and urged to enter the cod liver oil group the following year.

(b) Hay fever and asthma: Employees known to be subject to these conditions are seen early in the spring and urged, if they have not already done so, to be examined by their family physician or at a special clinic for asthma and hay fever patients. In a number of instances the company physicians give inoculations of pollen extract under the supervision of an outside physician who supplies the extract and written directions for its use. This arrangement saves considerable time and expense to employees.

(c) Tuberculosis: The latent forms of this disease are followed by yearly chest radiographs. The arrested cases are interviewed and are given a physical examination. Radiographs are often taken at more frequent intervals if there is any question as to activity.

6. DISEASES OF THE CIRCULATORY SYSTEM: The Criteria for the Classification and Diagnosis of Heart Disease[1] formulated by the Heart Committee of the New York Tuberculosis and Health Association and approved by the American Heart Association are used. The functional classification is especially valuable in grouping cases for recall. The majority of organic hearts are checked once or twice a year. In some instances oftener. Cases of essential hypertension, potential and possible heart disease are also followed.

7. DISEASES OF THE BLOOD-FORMING ORGANS: A large number of mild secondary anaemias

1. Criteria for the Classification and Diagnosis of Heart Disease, New York Tuberculosis and Health Association, New York City.

liberty to eat anything, they should be followed up. are under supervision. Blood counts and hemoglobin estimations are made at intervals to check the effect of treatment.

8. DISEASES OF THE DIGESTIVE SYSTEM:

(a) Constipation: A number of cases of simple atonic constipation and a few of the spastic type are followed up by physicians and the nutrition adviser.

(b) Peptic Ulcer: This group is usually under outside medical supervision. However, an additional check is made from time to time to see that its members are keeping in touch with their physician or clinic. Because of the fact that patients who have had surgical procedures for the cure of ulcer are apt to feel at

9. DISEASES OF THE GENITO-URINARY SYSTEM:

(a) Venereal disease: Cases of gonorrhea or syphilis are referred to the family physician or clinic for treatment but are called back to see that treatment has been adequate. In the case of syphilis, Wassermann tests are used as a check on the disease.

(b) Hypertrophy of the prostate gland: Employees found to have this condition to an extent requiring treatment are referred to their family physician or to a clinic. Follow-up is carried out to insure treatment.

(c) Dysmenorrhea: Mild cases are treated in the dispensary. Severe cases are referred to the family physician or clinic.

(d) Albuminuria: Urine showing the presence of albumin is retested and a microscopic examination made of the sediment to determine the significance of the finding. When a diagnosis of nephritis or cystitis seems probable the case is referred for outside medical care and a follow-up instituted.

10. DISEASES OF THE GLANDS OF INTERNAL SECRETION:

(a) Adenomata of the thyroid: These tumors are checked yearly as to size and a general examination made to determine the presence of toxic signs. Employees who have had thyroidectomies are also followed up. Occasional cases of hypothyroidism are recalled to see that the administration of thyroid extract is not neglected.

11. DISEASES OF THE SKIN:

(a) Occupational dermatoses are of course followed up. In addition employees exposed to fumes or solutions apt to cause dermatitis are seen at regular intervals as a preventive measure.

(b) Ringworm: A number of cases of ringworm, particularly of the hands or feet, are kept under supervision. We find that employees are apt to stop treatment when this condition is only partially cured.

12. DISEASES OF THE NERVOUS SYSTEM: There are a number of employees exhibiting signs of nervous instability who are at variance with their environment at home and in the factory. By means of investigation and repeated follow-up it has been found possible to adjust some of these problem cases and prevent a complete nervous breakdown. The treatment of definite psychoses is considered outside of the realm of the medical department.

13. DISEASES OF THE LOCOMOTOR SYSTEM:

(a) Arthritis: The insidious onset and slowly progressive course of the chronic type of arthritis deformans tend to make individuals afflicted somewhat indifferent to the need of treatment. Considering the disabling effect of this disease, it is highly important that cases should be seen in their incipiency and referred for complete examination and treatment.

(b) Structural defects: In the course of physical examinations of employees many structural defects and weaknesses involving muscles, tendons and joints are discovered. Most of them are acquired. Quite a considerable number are directly traceable to occupation. Not infrequently these defects are encountered during the examination of an employee injured at work. For example, the man with a simple backstrain may show poor musculature which makes him susceptible to repeated backstrains. Sometimes his job can be changed but usually only temporarily. We are learning that it pays to give these men body-building exercises which will help prevent further strain and perhaps compensation costs. These potential accident cases should be followed up.

14. CONCLUSION: A group of physical impairments discovered in the examination of employees of the Eastman Kodak Company has been presented and a method for adequate follow-up described.

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## Gall Tract Visualization

THE DISCOVERY that the injection of eosin or mercurochrome directly into the blood stream of rabbits produces a fluorescence of the entire biliary system when exposed to ultra-violet radiation, may be of great importance in the diagnosis of diseases of the biliary system of human beings. Observations made on seven adult rabbits in two of which the mercurochrome was directly injected into the gall bladder itself instead of into the blood stream as formerly done, showed the advantages to be (1) the greater amount of dye which can be used, thereby increasing fluorescent vision; (2) the rapidity with which examinations may be made, since it takes at least 15 minutes for the dye to appear in the gall bladder after intravenous injection, which it does in less concentration; and (3) the probable relative lack of danger, since proportionate amounts of mercurochrome in the blood stream might be toxic.—Drs. C. J. Sutro and M. S. Burman, in *A. M. A. Journal.*

# Medical Relation and Compensation

*—Abstract of a Recent Report by the American Medical Association—*

EVOLUTION OF THE SYSTEM: In studying the history of the evolution of the workmen's compensation system, it will be discovered that the employer formerly had three common defenses as follows:

1. The "fellow servant" doctrine — this absolved the employer from all responsibility if the injury was due to the actions of a fellow employee.

2. The principle of "assumption of risk" — that is, any person seeking employment assumed the risks of the occupation.

3. "Contributory negligence" — which required the injured employee to prove that no oversight nor carelessness of his had contributed to the happening of the accident.

These were the so-called "common law defenses." However they were abolished by the various states during the period 1886-1917 and because of their being abolished, the situation therefore precipitated the stage of what is called legal liability.

These conditions also brought a very important person into the compensation picture — the *insurance carrier.* Compensation insurance had already been in vogue in England during the period 1880-1897 and English insurance companies were, therefore, ready to enter the United States in 1886, when this phase began in this country.

The principle of the insurance carrier was to make an adjustment out of court — to utilize delays and technicalities to defeat the claimant. In doing so, it had money to hire the best legal talent and in the successful defeating of many claims, therefore, little money went to the claimant and his dependants.

The result was that the general public became so disgusted with the attitude and practices of the insurance carriers that large verdicts in favor of claimants occurred and this naturally increased the rates of insurance carriage. Eventually, therefore, this led to the general favoring of compensation legislation by employers.

Physicians were left entirely out of the hastily considered plan for compensation. It was in essence a financial system depending upon *medical decisions.*

*Social workers* were another group brought into the picture and they were distinctly opposed to the monetary principles and the brow beating attitude of the carriers.

In addition to their activities in regard to claims, the insurance carriers were also able to influence legislation by hiring the best legal minds and doing a great deal of lobbying.

The control of medical service by industry was also evident at this time, especially in lumber camps, mines, and railroads, where medical facilities were not easily obtainable.

There was built, therefore, a system in which emphasis was misplaced on cash compensation instead of on the solution of medical problems. Only a minority noticed this misplacement.

This attitude, however, has now undergone a considerable change to include medical and surgical care, as well as the prevention of accidents, which are now construed to be the objects of compensation acts.

PREVENTION OF ACCIDENTS: It was expected that the compensation act would naturally reduce the frequency and severity of accidents. In this respect, however, considerable disappointment was to be experienced.

All of the modern ballyhoo of advertising had been used in attempting to put over the idea that accidents were controllable events. However, there was considerable lack of statistical foundation for the many allusions in the literature that accidents have been materially reduced, although in many quarters these were not accepted by thinking people.

Furthermore there has been no accepted definition of the term "accident." There has been a tendency to include occupational diseases, there have been restrictions placed upon the definition by various authorities, and all in all, it has been difficult to establish a base upon which one could erect a permanent structure, so far as statistics are concerned.

Another difficulty is the variability of state reports when recording accidents. Some states limit their reports regarding the time lost and report only such accidents as occur within a certain period of time lost. Other states include only certain types of accidents, while some include occupational disease in the report. Obviously, therefore, there is difficulty in comparing these results and reaching any logical conclusion — in fact, it is impossible to make a comparable study in different states.

During the evolution of the accident-prevention program, a great many employers came to the conclusion that it was cheaper to pay insurance than to pay the cost of the safety program. Under such practices, there were many injustices to employees.

When we study closely the accident-prevention movement, we find that it was mainly dominated by the mechanical, legal, financial, and supervisory points of view; this attitude almost entirely ignored the important person, namely the individual. Enough evidence has now been collected to prove that there is an equally large field of opportunity in studying the individual reactions in the field of accident-prevention. It would be difficult to emphasize this principle and delegate to it its real importance.

In the future, a just consideration for the individual and his participation and responsibility in accident occurrence will depend upon an adjustment of the general practitioner to industrial conditions. However, with the help of local medical societies and the closer association of industrial and general medicine, this problem can be solved.

ADMINISTRATION—INSURANCE CARRIERS: The common form of administration is the *commission,* which is usually a political unit supervising claims, medical fees, and insurance relations.

Insurance is usually carried in four different forms: (1) stock companies; (2) mutuals; (3) state funds which may be exclusive; and (4) self-insurers.

The stock companies have been in control of the situation in many phases and have continued to be in control up to the present time. The expense ratio of the various companies has been about as follows: Stock 38%; mutual 20% — compulsory state funds 10% — exclusive state funds 4%.

It is stated on good authority that there would be a total saving of thirty million dollars annually if all the insurance were handled by exclusive state funds. Although state funds have become very efficient, they have not embraced all of their opportunities by any means. In instances where comparisons have been possible, state funds have paid the highest compensation amounts and self-insurers have been next.

The most disturbing point in insurance administration is that methods of administration in these companies like the original legislation are dependent upon pressure methods rather than differences in forms and laws. Therefore employers and insurance carriers have benefited under this system, while workers and physicians have suffered proportionately.

GROWTH AND PROVISIONS FOR MEDICAL CARE: During the year compensation has been in effect, a number of changes have been noted. An analysis of these changes shows:

1. A steady increase in the amount of compensation granted.

2. A decrease of the "waiting period;" (during this period medical aid is available).

3. An increase in the scope of coverage, regarding occupational hazards, types of manufacturing and other similar factors.

4. A continuous increase in the amount of time and money used for medical care. *This is now practically unlimited.* (Physicians and hospitals are now paid $72,000,000 a year, according to Dr. Ethelbert Stewart).

It is important to remember that all injuries receive medical care whether paid compensation or not. The waiting periods vary in the different states from five to 30 days — only one state (Oregon) has no waiting period.

Cumulative records show that the number of injuries requiring compensation were 2.88% in 1920 — later the number was reduced to 2.54% — while in 1930 the number was further reduced to 1.55%. This is very significant as will be shown later. (These figures were taken from the experience of the National Industrial Conference Board and were based on 600,000 to 1,000,00 employees.)

*Disability ratings depend upon medical decisions.* In Virginia 47% of the temporary total cases recovered in seven-days' waiting period and, therefore, did not receive compensation. It is assumed, however, that medical treatment was given in these cases. Influence of waiting periods can be appreciated when it is known that when New York reduced the waiting period from 14 to seven days, the payments for compensation increased one million dollars inside of one year following the reduction. It is highly significant in medical relationships that the anatomical descriptions in the various compensation provisions differ widely in the different states. *Only one state (West Virginia) recognizes by law a complete anatomical classification!*

The definition of the word "accident" also puzzles physicians, causing a constant conflict between the legal and financial definitions of pathological conditions. Furthermore court action in a number of states has legalized lay interpretations — this has occurred in Wisconsin and California where the respective commissions in these states have given interpretations which have been legalized by court opinions.

The task of the medical examiner is five-fold according to Kessler; he must:

1. Make a diagnosis.

2. Determine the responsibility for occupational disease if any exists.

3. Determine the percentage of temporary disability.

4. Determine whether there is permanent disability.

5. Determine the cause of death.

Great importance is attached to medical care in

temporary disabilities, because these constitute 95% of all injury cases. It has also been discovered that during such periods (obviously because there is no compensation paid) the financial benefits are entirely inadequate.

Heinrich estimates that there are ninety million accidents in the United States annually — that only three million receive compensation — the other eighty-seven million receive medical attention only and produce an average loss of $2 each. Hence it will be seen that there is great necessity for controlling the medical aspects of occupational injury cases — it is estimated that the three million compensation accidents cost $738,000,000 for medical care.

Another important consideration is rehabilitation which has developed only during the past few years. National provisions are now made for rehabilitation and provide for financial aid through the various states, 44 states having accepted the cooperation of the national government.

*It should be emphasized that in protection, treatment and rehabilitation of industrial accident cases, the physician becomes the most important figure of the entire system.*

Finally, in reviewing the growth of provisions for medical care, it is quite evident that the factor holding back progress of the compensation system has been the neglect of the medical side, which has now come to be recognized to be of prime importance.

CHOICE OF PHYSICIANS: In the evolution of the workmen's compensaiton acts of various states, the employer assumed the right of selection of physician, contrary to medical ethics. This choice was made in many instances for an entire group. It is to be remembered that the value of the physician in his relationship to the patient is based upon confidence and also upon fair competition among qualified men.

In all human activities, it is to be noted that the pendulum is swinging toward the condition of individual relations — this is evident in many instances. It is not fair, therefore, to experiment with human relationships in the compensation system and to make that system an example of an exception from this predominating tendency.

The conflict between financial and therapeutic motives is liable to color the relationships of patient and physicians and also to lead to corrupting influences.

Two arguments are advanced for supporting the principle of the employers' choice of physicians: (1) the employer pays the bill (but it should be remembered that the money is for the injured); and (2) special service rendered by carriers is said to be superior to that rendered by private practitioners (but this service is carried out largely on the principle of cost instead of merit and according to an experienced surgical director differs little from the service rendered by private practitioners).

In Massachusetts, Rhode Island and North Dakota, free choice of physicians is permitted by law and has not led to evils predicted by the insurance carriers.

The evils arising out of the present compensation system caused the adoption of the so-called "panel system" in Wisconsin and California; this requires the employer to designate two or more physicians for a choice, in the locality accessible to the injured person.

In New York negotiations are now pending between the State Medical Society and the Compensation Commission, which promise to remove some of the long-standing and greatest troubles that have previously existed.

PAYMENT FOR MEDICAL SERVICES UNDER COMPENSATION: Sharp controversies have arisen regarding the payment of fees because medical rates are not fixed, thus resulting in bargaining. The real point to be emphasized is that medical care is for the benefit of the injured and for no one else. In stock companies, of every dollar colected, $.42 go to the carrier, $.38 for cash compensation and $.20 for medical care.

Many times, the carrier tries to get treatment for the injured on a charity basis, both in hospitals and by physicians. This is possible because the medical rates are not fixed.

A number of peculiarities have been emphasized by Dr. E. W. Williamson of the American College of Surgeons: (1) the necessity for a considerable number of reports; (2) "listing cases;" (3) the difficulty in collecting fees; (4) the frequent subpoena of records for court proceedings; (5) the answering of many inquiries, by letter, by telephone, and by personal contacts; (6) the many problems of the discharging of convalescent cases; (7) difficulty of securing authority for treatment; (8) "third party" cases; (9) lack of cooperation of surgical services with hospital administration. These are the usual difficulties which have made it almost impossible for physicians and surgeons to carry on an efficient type of service in regard to the compensation acts.

All of this has led to the adoption of fee schedules in many states — however, these fee schedules differ very widely. Any such schedule is very much better where fixed by the cooperative agreement of the industrial commission and organized medical groups, such as the state and county societies and associations.

There are no accurate data relating to medical expense available — what figures are procurable are highly variable, ranging from forty to eighty million

dollars a year. The fact is that the cost of medical care in relation to compensation work has increased by demand, but the carriers try to pass it on to the physician or to the hospital. In some states reductions have been made by the commission, notably in Kansas, Nebraska and Oregon. Finally, the whole question resolves itself into one of cheap service versus professional emulation.

PROFESSIONAL RELATIONS IN COMPENSATION: Because of friction arising between compensation patients and physicians who treat them and even because of one instance of murder, the claimant is now obliged to sign an agreement that the physician can testify regarding the diagnosis and treatment of any given case.

In the State of New Jersey, the Labor and Compensation Commissioner is and has been for many years a qualified physician (Dr. Andrew McBride). Dr. McBride developed the habit of appointing local boards of three physicians to function in various portions of the state — one was selected by the medical society, one by insurance carriers and one by the state. According to the experience in this state, this system has worked very well and Dr. McBride recommends that such boards of physicians be put on a salary basis.

In Utah the Committee on Industrial Medicine of the Utah Medical Association meets with the Industrial Commission once a week adjusting claims and seeing patients.

In California there is noteworthy cooperation between the medical profession and the compensation commission and this situation is spoken of very highly by the officials of the commission. There is definite lack of cooperation in the State of Washington because the industrial accident commission has not seen fit to accept the overtures of the organized medical groups.

In New York there has been much turmoil previously, but a cooperative agreement has now been reached, which includes the appointment of a medical advisory board. However, this has had little effect upon the underpaid and overworked physicians who do most of the work in connection with the compensation act.

Only 16 states have a medical department associated with the administrative body of the workmen's compensation act; organized medicine has not been given a voice in the selection of these officials. It therefore appears from these specific experiences that the physician who is the person with the greatest amount of training and experience of those participating in compensation work and the person whose decisions are most vital to every action, remains the lowest paid participant and the one with the least influence in administration.

COMPENSATION AS ORIGIN AND FOSTERER OF CONTRACT PRACTICES: Medical service in industry was originally applied to groups where facilities were not available but now covers over one million workers and extends in some cases to the members of families of employees of various groups. It is not a question of the good of industrial medical service and the necessity for it, but rather the wisdom of the methods of origin and of applying the service — in many instances an industrial medical service is established for the specific purpose of curing the financial ills of employers rather than the physical ills of the employees. "Payroll check-offs" have led to a superficial and perfunctory type of medical service.

In Washington where an exclusive state fund plan of administration handles all phases of compensation, economy can be accomplished largely and only by reduction of medical costs, which means low prices and inferior service. Such a plan seems to have corrupted insurance carriers as well as physicians. In Washington also, contract practice has developed to such an extent that it threatens the economical and ethical foundations of the profession in that state.

It is known that "farming out" services is a common procedure where bargaining and low-priced rates are in effect. This results in a wholesale service to groups planned almost entirely on a financial basis.

A special committee of the Washington State Medical Association has submitted certain recommendations to the house of Delegates of the American Medical Association in September, 1932 for changes in the industrial practice act which it is believed are necessary, if medicine is to continue on a scientific and sound basis. These are as follows:

"1. A board of physicians, selected by the State Industrial Commission and the Washington State Medical Association, to determine the capabilities of the physicians for handling contracts.

"2. To give to the State Industrial Board the power to accept or reject contracts on a basis of competence, honesty and remoteness of the contract; the right to judge whether or not the applicant can give a high quality of service.

"3. Contracts to be granted only to physicians licensed to practice in the State of Washington, — actually practicing and giving personal supervision.

"4. The Medical Aid Fund to be paid to the contracting physician according to the going rate of that class. This is to avoid rebating. No doctor shall have financial interests in a company with which he has a contract.

"5. Supervision of supplementary contracts by the Industrial Insurance Board. Under this supervision, the establishment of a minimum rate per month for the supplemental contract in consultation with the Washington State Medical Association; also the rule that a supplemental contract cannot be held unless same physician holds the industrial contract.

"6. Contracts to be made only with those physicians who agree to operate them, and not with the corporations or laymen.

"7. Non-industrial contracts. Any person holding himself out as treating the sick for a specific sum per month or per year shall be declared to be in the insurance business, and shall be required to submit the conditions of his contract to the insurance commission and to give bond for the proper performance of his contract. This shall not apply to contracts dealing with men who are engaged in extra-hazardous occupations coming under the Industrial Insurance Commission.

"8 Solicitation of contracts by lay solicitors would be corrected through modifications in the New Medical Practice Act."

Conditions in Washington have been described at some length because they are repeated with slight changes in Oregon and California, while several other states are traveling the same road only a few years behind Washington.

SUGGESTED CONCLUSIONS AND RECOMMENDATIONS: The report contains the following suggested conclusions and recommendations:

Knowledge of industrial environment is a help in diagnosis and treatment. So is a knowledge of heredity. But it does not follow than an adult's ancestors should choose his physician. The economic relation of employer or insurance carrier does not confer ability either to give or to judge medical treatment. It is more apt to create a conflict of interests that positively unfits for any such function.

The principle has a wider application. Because an organization functions well as an employer or insurance carrier it does not follow that it is suited to operate a medical service. On the contrary, forcing the personal relations of the patient and physician into the mold of an industrial organization is very apt to distort and destroy the most valuable features of those relations.

A large percentage of the evils that have grown up in compensation medical practice can be traced to efforts to produce medical service with instruments primarily intended to produce other goods and profits. It is somewhat as if a packing house should try to produce cutlery or a foundry to turn out legal services without changing equipment. The character of the desired product must be the determining factor in any organization, and the success of the organization, is judged by its product. The product aimed at by an efficient system of medical care is such personal relations of the patient with the physician as will best restore and maintain health, and any such system must center around this objective.

Every question that comes up must be decided according to this test.

Apply this test to some controverted points. It may be, and probably is, true that industrial surgery calls for some specialization. But getting a job with an industrial establishment or an insurance carrier is not a test of competence as an industrial surgeon. Experience has amply shown that it is far more often a test of ability to meet certain economic and financial qualifications. The applicant is apt to be judged far more according to the salary he will accept, his ability to reduce labor turnover and willingness to provide the sort of testimony that will keep down compensation payments than by his educational background and professional attainments.

After he is hired, if his relation to his patients is forcibly determined by their economic position as employees, and if his ability to hold his position is determined in any degree by his success in keeping down the costs of compensation and reducing lost time, then to just that extent his professional actions are rendered an imperfect instrument for the production of good service. He must bend his scientific judgment to his economic interests as a very condition of survival, and he will be the more strenuous and sincere in so doing the more he becomes unconscious of these influences.

The harm that proceeds from such situations spreads far beyond those immediately subject to its conditions. Compulsory patronage by patients creates a condition of "unfair competition" such as has been made criminal even in many fields of business. It is not simply that the physician in many forms of contract practice is driven to actions that have always been condemned by his pofession. The very fact that patients come to him by compulsion and not by free choice makes it impossible for him to judge himself or to be judged by his fellow practitioners and the public according to those comparative standards the attainment of which has been the greatest incentive to professional progress.

This isolation is especially harmful to this very specialty of industrial medicine. The ablest, most professionally ambitious and conscientious of its practitioners constantly complain of the indifference of the profession and medical schools to the significance of industrial causes of disease. It can never be otherwise so long as compensation practice is a

closed corporation dominated by economic motives and maintained by compulsory patronage. Physicians outside the closed circle who note the increasing dominance of economic considerations and the rapid growth of such undesirable forms of contract and clinic practice as have been described come to look on compensation practice as a threat to all medical ideals and the existence of the individual practitioner. They will therefore tend to underestimate the importance of industrial relations on disease and its treatment. They will oppose the introduction of such subjects into the curriculums of medical schools so long as compensation practice is so closely monopolized in forms repugnant to traditional medical ethics as to make such education of little benefit to the profession as a whole.

This very attempt to make the effects of occupation on health a specialty confined to those in "indus trial practice" is itself another sample of the confusion of economic and medical thinking. To the extent that occupational conditions affect health and medical treatment they are a concern of every physician attending any one having an occupation. But those who speak of this specialty seem to imply that its practice is limited to those physicians who are employed by an industrial concern.

The judgment of the "chosen" and that of the "excluded are thus almost equally warped by economic outlooks. Emotional reactions and financial interests distort scientific attitudes on both sides. These attitudes tend to divide the medical profession and thereby to reduce its influence in determining the form of compensation institutions. As this condition crystallizes and the industrial phase grows it develops its own standards, establishes its own institutions and translates its adopted customs into its own codes of ethics.

In these codes of ethics an attempt is made to combine the old standards with the new conditions. But the problems of practice under the relations and institutions that have grown up in compensation practice are not the same as those encountered in private practice. One writer has sought a solution by saying, "Physicians and employers both must realize that industrial medicine is, in a measure, a compromise between the ideals of medicine and the necessities of business."

But such compromises are often dangerous and sometimes impossible because neither economic conditions, industrial relations nor "business necessities" can change anatomic, physiologic or therapeutic facts. After all, the physician is not treating "compensation cases" but ailing persons.

This division within the profession is not the least of the evils arising from an effort to arrange "a compromise between the ideals of medicine and the necessities of business." Once that division has arisen, it becomes a valuable "vested interest" of powerful commercial and industrial organizations that seek to foster and encourage its development. It would be but aiding and abetting their efforts to cite instances in which the efforts of state medical societies to abolish some of the evils of compensation practice were thwarted by the efforts of those who "rode to the meeting on passes" to defend the interests of the employers. Nor does it help matters any to quote the claims of these favored ones that their opponents were motivated by "jealousy" of those criticized.

Such mutual recriminations prove nothing either as to the sincerity or the scientific justification of the position of either side but they do excellently illustrate at once the difficulty and the necessity of separating economic motives from scientific discussion of professional problems. It was not a mere coincidence that in an investigation by a committee of the State Medical Association of Washington the percentage of affirmative replies to the question of favoring contract practice was almost identical with that of the physicians engaged in such practice.

That such division of professional forces will be harmful to both sides, and most of all to the public, will be readily admitted. Yet there is danger that this cleft will be widened still further through the efforts of the economic interests that hope to profit by such a division, just as it was widened by similar developments in some European countries until there arose a separate economic medical organization. In the European experience, the economic organization, no longer backed by a united profession, became more and more helpless to defend itself against the encroachments of "business necessities" until it was almost the literal slave, economically and scientifically, of business interests.

Nor is the lesson of European experience any more gratifying to the opponents of those engaged in contract and other forms of industrial practice. As such practice expanded, the physicians in private practice dwindled to an insignificant and almost starving percentage of the profession.

Experience supports logic in the conclusion that no help can come from further compromise between economic motives and scientific standards. It is better to "render unto Caesar the things that are Caesar's" and to confine the inevitable changes in social and economic relations as far as possible to their proper fields, while the human and scientific relations between physicians and patients, already tested by persistence through centuries of such social changes, continue to be judged by human and scientific standards.

This is no counsel of perfection, impossible of attainment. It is in just such states as Ohio, Massachu-

setts, Maine, New Jersey, Wisconsin, Utah, and a few others where there has been the least interference by lay industrial organizations in the setting up of medical institutions in compensation practice that there is least friction and least complaint by all concerned. Neither employers, carriers nor medical promoters have ever even attempted to show that conditions in these states, even measured by economic standards, are not to be preferred to those prevailing in states with a multitude of lay controlled clinics, contracts, and hospital associations, or where the medical service is in any other way dominated by employers and carriers. In these states the ground is fairly clear for the establishment, should such action ever be thought desirable, of any special medical arrangements for handling compensation practice. Such institutions can be set up by, and under the control of, the medical profession, for the single purpose of furnishing the best available medical service in compliance with scientific and ethical standards.

The question of whether specialized education and training is needed for compensation practice is a scientific and not an economic one. If standards of qualifications are to be set up for this purpose, they should be set up by the medical profession and not by employers or insurance carriers, and be based on education, training, experience, skill or such other qualities as make for greater ability to treat the sick or injured, but the "necessities of business" have no place among such standards.

1. There should be absolute free choice of physician or surgeon by the injured worker among those competent to give the services required. That competence should be determined by professional standards and not by financial considerations.

2. There should be no solicitation or compulsion exercised on patients to compel them to enter into any scheme of medical care. Any deviation from this rule means that medical qualifications and consequent medical care are made subject to financial considerations.

3. All expenditures for medical care should go to those who give that care. There is no excuse for the presence of the profit-taking promoter, organizer or entrepreneur between the physician, surgeon, nurse, hospital or other agent giving such care and the patient who receives it. Every attempt to introduce such a third party has been proved wasteful and harmful.

4. There should be medical representation in all compensation institutions proportionate to the medical interests involved. Questions of a purely medical nature should be passed upon by those who have met the standards set up by law to determine medical qualifications and who alone have been pronounced capable of passing on such questions.

5. It is important that in every state medical society there should be an active committee devoted to the study of the problems of industrial medicine. Wherever compensation laws exist, this committee should be in close and continuous contact with the administrators of compensation, to the end that medical subjects be presented from the scientific professional standpoint and that all physicians may be kept fully informed of any questions at issue.

6. There should be greater consideration for the human side of accident-prevention programs and the active participation of physicians in such work.

7. It is suggested that efforts be made through joint action of state medical societies and the compensation authorities to establish more equitable and uniform fee schedules.

The fifth suggestion is really the only essential one and implies all the others. This study has shown that the form of legislation and institutions is of far less importance than their administration. If that administration is monopolized or dominated by the interests that are concerned primarily in conserving the income of employers and carriers, then the medical care of the injured workers and the professional standards on which that care so largely depends will be neglected, not so much through direct intent as through indifference, neglect and overemphasis of the interests actively and intelligently concerned in such management.

If the medical profession remains continuously and thoroughly conscious of its responsibilities and opportunities, if to its undisputed monopoly of the scientific knowledge of medical diagnosis and treatment it adds an equally thorough knowledge of the best economic, political and social methods of applying that knowledge to the situations that arise under competition, the many illustrations already given prove that the public and even the employers and carriers will be willing to listen, and even to follow, the counsel of the organized medical profession.

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## Sleep

SLEEP is an important activity in the life of everyone and is generally looked upon as the most complete form of rest.

Sound sleep is promoted by regular hours and regular habits. Worry, fear, anger or undue excitement may produce restless sleep, because they interfere with relaxation. When one cannot sleep, it is well for the sufferer from insomnia to give up trying and resign himself to lying awake. In many instances this accomplishes the desired result, for the horizontal position decreases muscular, circulatory, respiratory and metabolic activities.—N. Kleitman, in *Clinical Medicine and Surgery*.

# Malpractice Insurance

*—Some Reasons and Arguments Why You Should Carry Insurance—*

*by*

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*Chicago*

HAVE YOU ever been sued for malpractice? Have you ever been threatened with that kind of suit if you persisted in trying to collect a bill for your fees?

If you can answer these two questions in the negative, you have either not been long in practice or you have a right to consider yourself fortunate; and if you are that fortunate, how long do you expect your good fortune to continue?

Malpractice suits are becoming more frequent; racketeering of this sort by ambulance-chasing lawyers and "get-easy-money" laymen is becoming a more constant threat, and as soon as a physician or dentist begins the practice of his profession he is liable to become the prospective prey of these human parasites.

While it is a fact that thousands of professional men are never sued for malpractice, who can say that they never will be? Many of us have never had a fire, but how many wise men will go without fire insurance?

None of us is immune to malpractice suits. The best known and most expert in all lines and specialties have been sued and still may be sued.

It is recognized that a large number of these suits are threatened and filed for the primary purpose of evading payment of fees; but not all of them are instigated for that purpose. It is undeniably true that once in a great while a medical malpractice suit is based upon real malpractice, but for every one of that classification, there are hundreds where no real malpractice occurred.

At the present time a physician or dentist may any day receive a summons to answer an action for malpractice regardless of how careful or how conscientious he may be, whether he is a general practitioner, surgeon, dermatologist, orthodontist, extractionist; all are equally liable to become the quarry or prey of this ungrateful ruthless and cold-blooded legal action. We all know of instances where patients—from whom the physician had every reason to expect the most gratitude—with the connivance of the scum of the legal profession, threaten and file suits alleging the grossest of ignorance, negligence and improper diagnosis or treatment, and present in their declarations or bills of particulars a recital of grievous wrongs which if only half true would create an appalling state.

It costs little to start a malpractice suit but it requires an enormous amount of time, trouble and thought, not to mention the mental distress to stop such an action when once started. The "shyster" lawyers who instigate these cases and who are so often the incitors of the action are most active against physicians who carry no insurance, and when these blackmailers learn that they will have to fight insurance companies, and they have ways of discovering this, they are much the more likely to drop proceedings than if they are met with the fearful and trembling attitude of the uninsured.

A RATHER CASUAL search of the medical and dental press, made a few years ago, disclosed some very interesting comments and advice on the question of malpractice. I will quote a few because they are doubly true today:

The Annual Report of the Committee of the Ohio State Medical Society on Medical Defense, *Ohio State Medical Journal,* 36:426-429 (May) 1930, states: "Experience has shown that practically all civil malpractice suits are unjustified and, in effect, are efforts by disgruntled individuals to bleed physicians of money or to ruin professional reputations.

"Comparatively few suits alleging malpractice are sustained in the courts. However, every threat made, or suit filed, casts an unpleasant reflection on the reputation of individual physicians and tends to shake the confidence of the public in the entire medical profession.

"The growing craze for quick and easy wealth, the false assumption held by many that physicians can and should guarantee their work, the greed of ambulance chasing and contingent fee lawyers, the vituperation of quacks and cultists, and especially the vicious or even the thoughtless remarks and criticisms by physicians concerning fellow physicians, have been responsible for most malpractice suits. Naturally some suits for damages against physicians are based on fairly substantial and reasonable evidence of carelessness or neglect, but these are few and far between when compared to those which are founded wholly on a malicious attempt to blackmail or persecute a reputable, honest and valuable practitioner."

In a further consideration of the causes of malpractice suits and means of preventing them the *Ohio State Medical Journal,* 27; 157-160 (February) 1931, under the heading "Important Court Decisions and Other Legal Points on Physician's Responsibility to

Patients" states: "the apparent disregard on the part of many physicians of the well-established fact that practically every act which they perform in the practice of their profession is conditioned on and subject to some well-defined principle of law, is unfortunate and leads this Committee on Medical Defense to believe that one of its chief functions is to emphasize and stress the importance of every physician having a working knowledge of some of the vital principles of medicojurisprudence."

IN AN EDITORIAL entitled "Malpractice Suits against Dentists," the *Journal of the American Dental Association*, February, 1929, says: "The growing, prevalence of damage suits against dentists in certain sections of the country should arouse the profession to take a firm and united stand against this species of imposition. Most suits are instigated by designing lawyers whose methods are akin to those of the knave and the crook. It is usually blackmail pure and simple, and while this fact is recognized quite generally by the profession, it is small solace to the poor victim when an unjust verdict is rendered against him.

"It is an unwritten law that from the moment a patient takes a dentist's chair, there is not only a professional obligation but a moral one, as well, to guard in every way possible the best interest of the patient as far as the teeth and mouth are concerned, and a man who thinks carelessly of this obligation and permits harm to come to the patient through neglect soon finds himself without the pale of professional respect or recognition.

"It is usually the man of ordinary skill and care who is deliberately made the victim of the designs of unprincipled people who are out to wring money from him maliciously. And here is the most significant fact connected with the whole subject, seldom is a suit started, or even suggested that has not as its background a derogatory remark made to the patient by another dentist. A prominent official of one of our liability insurance companies is responsible for the statement that, back of nearly every malpractice suit, there is the circumstance of a disgruntled patient consulting another practitioner and telling a tale of woe which is listened to with more avidity than it should be; the seeds are thus planted for a damage suit. If every dentist to whom there comes a dissatisfied patient would take the precaution to relieve the patient's mind, and to emphasie the fact that misadventures are likely to happen with the most careful operator—in other words, to follow the golden rule of treating his fellow practitioner as he would wish to be treated under similar circumstances—it would at once prevent most malpractice suits."

Commenting on Dental Malpractice, *Dental Items of Interest*, 50:233 (March) 1928, says: "Malpractice suits against dentists have become so common that the majority of practitioners have found it advisable to protect themselves by insurance. Might it not be well for us to consider the question, What is malpractice? Possibly with such knowledge we might be able better to avoid litigation. After all, insurance does not keep us out of law suits. A prominent attorney once told the writer that, 'anybody can bring a suit against you for anything.' This is an angle of the question, by the way, well worthy of discussion and study. For example, if a statute might be enacted compelling a litigant to deposit a bond, large enough to cover the defendent's costs, including attorney's fees should his suit be lost, many malpractice suits would never be brought, especially as it is commonly believed that the majority of them are instigated by shyster lawyers who work on a 'fifty-fifty' basis. The suggestion, however, never meets the approval of any lawyer, the prompt claim being made that putting up a bond would deter many poor men from bringing righteous suits. The reply that the method would lessen the number of unrighteous suits is usually met with a shoulder shrug."

DR. EDWARD J. CANNON stated in *Northwest Medicine*, December, 1929: "I do not wish you to believe that it is my view that the physician or surgeon is never at fault. We have lazy doctors just as we have lazy lawyers, who neglect their cases as the lawyer neglects his, who fail to keep abreast of the advance of medical science and skill just as the lawyer fails to read the decisions, who takes his cases in a slip shod manner. If his laziness in attending to the case or his laziness in keeping abreast of his profession results in damage to the patient this doctor should be punished, and the way to punish him, outside of your profession, is to make him pay damages.

"The causes of suits against doctors are many. People of the present day, without appreciating the fact that a little knowledge is a dangerous thing, read articles found in newspapers, some of them written by advertising doctors, and think from reading that they know something about medicine and surgery and they become critical. The smattering of knowledge that they have leads them to become fault-finders and they have to profit by their fault-finding.

"In our own ranks we have little to complain of. Some doctors take delight in conveying the impression to a patient that the doctor who has treated the patient has failed of duty in some manner."

The report of the Medicolegal Committee of the Kentucky State Medical Society as printed in

the *Kentucky Medical Journal*, 26:453 (September) 1928, comments as follows: "We regret to report that there is no decrease in the number of such unjust blackmailing malpractice suits against reputable members of the medical profession.

"It is very important that physicians, generally, carefully consider the character of such malpractice suits as are being brought. To this end they are urged to read thoughtfully the decisions of the courts published currently in the Journal of the American Medical Association. It is evident from careful study of such cases that there has not been a suit decided against a reputable physician in many years which could not have been prevented if the legal precautions which should now be known to all of us had been taken at the right time. The whole subject of malpractice procedure has become definitely technical, and, in order to avoid becoming victims of injustice from its operation, physicians must acquaint themselves with these procedures, as they do with the other complexities of modern medicine."

DR. HENRY M. BARNES, in the *New England Journal of Medicine*, October 29, 1931, says:

"Malpractice suits we have always with us and there is a reason—mostly monetary. A few are spite suits and are for personal aggrandizement of the lawyer. They harrass and stifle progress and are without redress. They are both epidemic and endemic, with immunity for none. There is always an open season on the doctor and it is a grave error of judgment for any one of us to consider himself suit-proof. The subject is perhaps not so pleasant for discussion as some others but it is of vital importance to our profession and well-being, and, like the choosing of a gravelot, should be considered as forethought rather than an afterthought.

"These suits, 95% of which are mercenary in character, have as principals, the so-called friendly doctor with whose workings we are familiar, and who as a rule becomes a party to the case by too much loose prattle.

"The carrying of protective insurance is as essential as life insurance for, although it is said that suits are brought more freely with the feeling that the doctor does not have to pay, the advantages of such a plan far outweigh its disadvantages.

"Medical societies have done good work by compelling the 'doctor called in on the case' to work in the open and by registering and checking his entire court testimony."

THE MINUTES of the Mid-Winter Session of the Council of the Michigan State Medical Association as reported in the *Journal of the Michigan State Medical Society*, 29:207-09 (March) 1930, contain the following comment: "The year just passed makes the twentieth successive year of the work of the Medicolegal Committee, under the guidance of the same chairman.

"This extended experience seems to justify certain definite conclusions. There has been no appreciable increase in the number of malpractice suits and threats. Allowing for the gradual increase in membership, the percentage of malpractice claims maintains a general average of just about 1%. Certain factors, particularly the compensation act, might be expected to have increased malpractice suits because the 'hungry lawyer' who is prevented from suit against the employer very frequently picks on the attending physician.

"A total of about 550 cases have been reported to this committee and the number resulting in final adverse verdicts is surprisingly small. Nevertheless, the trend toward large verdicts in all types of litigation occasionally hits the doctor, and the man who wants to play safe should double the indemnity of his insurance. During the past year there has been one verdict against a Michigan doctor, for $20,000 which, however, is not yet final."

Fortunately the members of the medical profession in Michigan apparantly appreciate their mutual responsibilities in alleged malpractice cases for the report further says that:

"There has developed a state-wide unwillingness to testify against a brother doctor, which is in marked contrast to the conditions prevailing 15 or 20 years ago. While purchasable medical witnesses can usually be found they generally now come from outside the state."

IT WILL BE NOTED that leading medical and dental publications from all sections of this country express just as strong language as the writer when discussing medical malpractice. Since many cases arise out of either the malicious or unwitting remarks of one physician regarding the work of another, before making a disparaging comment the physician might well consider the words of Francis Bacon who said: "I hold every man a debtor to his profession, from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves, by way of amends to help and ornament thereunto." Because of the study of malpractice suits and malpractice insurance covering a period of years, the writer urges those who do not carry insurance against malpractice suits to "stop, look and listen" before venturing further on the road of medical practice. "External vigilance is the price of liberty." *Opere pretium est.*

# Medicolegal Cases

## —Abstracts of Court Decisions—
## A New A.M.A Publication

IN GIVING expert testimony, physicians are often puzzled as to the kind of medical evidence which will be admissible. This mental indecision extends not only to statements made by the testifying physician, but also to the use of textbooks, medical journals, and roentgenograms.

In the case of *Brown v. Inter-State Business Men's Assn. of Des Moines, (Iowa), 224 N.W. 894,* the court stated that it is not permissible to introduce medical books in opposition to the testimony of a medical witness—the authors of such books are not under oath, are not, therefore, subject to cross-examination and do not give opportunity to the opposite party to confront them. It is, however, permissible to cross-examine a medical expert on the theory laid down in medical books on which the expert claims to have based his own opinion.

A similar decision was reached in New Jersey, when it was stated, as well-settled in New Jersey, that when a physician testifies from his own experience as an expert, he may not be impeached by the use of medical works on which he has not relied as an authority for his testimony. *(E. I. du Pont de Nemours & Co. v. White, 8 Fed. 2d), 5.* The court further said that it is only when a witness refers to a certain book for his own opinion that such book is receivable in evidence, and then of course only for the purpose of contradicting him.

It is significant that the Federal rule and the New Jersey rule are the same on this subject. It was, therefore, error to permit the expert witness of the defendant in this case to be asked (in an endeavor to impeach him) whether or not he agreed with certain medical works on which he had not relied as authority for testimony.

Further dictum on this subject has been submitted by the Supreme Court of North Dakota, in deciding the case of *Chezik v. Minneapolis, St. P. & S.S.M. Ry. Co., 218 N.W. 217,* to the effect that it is proper to examine an expert witness referring to data which forms, in whole or in part, the basis of an opinion expressed by him —that it is proper to test the knowledge and accuracy of the deductions of the witness by drawing his attention during cross-examination to the statements used by that particular authority. This is not, however, for the purpose of using selected abstracts as evidence, but to enable the jury the better to weigh the testimony of the expert. In this instance the physician had based his opinion on knowledge obtained from certain textbooks, from other works, and also from experience; the plaintiff objected to the use of extracts because of placing an unsworn author's opinion before the jury without cross-examination.

In *State v. Shahane (N.D.) 219 N.W. 132,* the conditions were a little different, although the same conclusion was reached. Counsel for the plaintiff asked the expert witness a question and, after he answered in the negative, called his attention to his disagreement with a standard textbook; whereupon counsel for the defendant objected on the ground that the opposing attorney was reading from a book. The objection was overruled and the opposing attorney then asked the question as to whether the expert witness would disagree with the textbook authority. Objec-

*THIS BOOK "Medicolegal Cases—Abstracts of Court Decisions," was edited by Dr. Wm. C. Woodward, Director, Bureau of Legal Medicine and Legislation of the American Medical Association, and contains all the abstracts published in the "Journal of the American Medical Association" during the calendar years 1926-1930, inclusive. It is published by the American Medical Association, 535 N. Dearborn St., Chicago, and was issued late in 1932. The book contains approximately 1300 case abstracts, 1336 pages, 6x9 inches, bound in library buckram, law book style; the price is $7 prepaid. An extensive index has been compiled in an effort to afford ready access to every important fact and principle as stated in the cases. It is believed that the volume contains an abstract of every published decision of substantial medicolegal interest rendered by Federal and state courts of last resort and by some of the more important intermediate appelate courts during the five years. The decisions abstracted cover a wide variety of subjects, including malpractice, breaches of contracts, insurance, workmen's compensation acts, mental incapacity, medical and dental licensure, crime, evidence, and other subjects of interest. Of special significance is the fact that an effort has been made to include both medical and legal implications of each case, making it easily understandable by all intelligent workers in medicolegal fields, even if they are without professional education in law or in medicine. The book is especially designed to aid physicians, lawyers, and other persons in solving medicolegal problems, by showing how similar problems have been met by the courts. In times when medicolegal cases are increasing in number and involving new and extensive principles, this work should be of great value in assisting those who must participate in the submitting of evidence, or those who are affected in any way by legal decisions. It will be found an essential in the work of industrial physicians, commissions and attorneys.*

tion to this question was overruled. The Supreme Court held that the objection should have been sustained, stating that it is permissible to prepare questions from medical books and to cross-examine the witness on the theory of works from which he claims to have based his opinion. It is not permissible, however, to use medical books in opposition to expert testimony given on the stand, since the authors are not under oath and available for cross-examination—and the dependant is entitled to be confronted with the witness against him.

The case of *Rund v. Hendrickson (Minn.) 222 N.W. 904,* involved the use of material from several medical journals. In this instance the defendant, over the plaintiff's objection, read excerpts from various publications asking the witness whether he agreed with the passages read. As judgment was rendered in favor of the defendant and the plaintiff's motion for a new trial denied, he appealed to the Supreme Court of Minnesota, contending that the trial court erred in permitting the defendant's counsel to read extracts from medical works confirming questions on cross-examination. The Supreme Court, in affirming the judgment for the defendant, stated in substance that medical works are not admissible as corroborative edidence because the authors are not under oath or subject to cross-examination. However, "where a physician testifying as an expert bases his opinion, in whole or in part, on such works, he may be questioned on cross-examination as to views differing from his in books which he recognizes as authority, although it may incidentally place the views of the authors before the jury." The court also realized that there were decisions of courts of high standing to the contrary, but said that "the weight of authority is to the effect that where a witness testifies as a medical expert, excerpts from books and publications recognized as authorities by his profession may be read in framing questions on cross-examination asked for the purpose of testing his knowledge and competency, the accuracy of his conclusions, and the weight to be given to his opinions."

**Roentgenograms as Evidence**

ROENTGENOGRAMS form many times an important part of the evidence introduced in medico-legal cases. There have been various decisions affecting the use of x-ray pictures; the substance of different cases will illustrate the differences:

The case of *Vale v. Campbell (Ore.), 263 Pac. 400,* was an action to recover damages alleged to have been sustained by the plaintiff as a result of negligence by the defendant in the treatment of a broken femur. The jury in the lower court returned a verdict for the defendant. The plaintiff had complained of a ruling in the lower court admitting the testimony of a physician that certain roentgenograms supporting his diagnosis were not produced at the trial. In affirming the judgment of the lower court, the Supreme Court stated that there was no error in admitting the testimony since a proper showing had been made that the roentgenograms were lost. The court stated further that roentgenograms were admissible in evidence only when supported by the testimony of the party taking them or an expert who knew that they showed accurately the true condition of the object represented; that roentgenograms are used as maps, plats or representations of physical objects; that they are valuable only when supported by the testimony of the witness. Roentgenograms differ from ordinary photographs because the ordinary person is not sufficiently familiar with them to be able at all times to discern what they represent. It is competent for one to have his expert in these matters to explain roentgenograms under proper supervision, so that the court and the jury may view the picture as the witness does.

In *Bucktrot v. Partridge (Okla.), 265 P. 867,* the defendant, on appeal, assigned as error the introduction of a roentgenogram in evidence, because it tended to inflame the minds of the jury against him. But the Supreme Court pointed out that the roentgenogram correctly showed the injuries received by the plaintiff, and the error could not be predicated on the actual facts shown when properly presented, even though such facts might be harrowing in their details and appearances. The court also referred to *(Bartlesville Zinc Co. v. Fisher, 60 Okla. 139; 159 P. 476),* to the effect that the admission of x-ray plates in evidence rests fundamentally on the theory that they are the pictorial communication of a qualified witness who uses this method of conveying to the jury a reproduction of the object about which he is testifying; this being true, the x-ray plates must be made a part of some qualified witness' testimony and the witness should qualify himself by showing that the process is known to himself to give correct representations, and that it is a true representation of such object.

Objection has been made to the introduction of a roentgenogram when taken by another person who is not produced as a witness, although the picture had been taken on the order of the witness who was testifying. The Supreme Court of Kansas held in this instance that, although objection had been made that no foundation had been laid for the introduction of the picture, there was no reversible error in the admission of evidence. *(Mercado v. Nelson (Kan.), 235 Pac. 123.)*

In the case of *Kavale v. Morton Salt Co. (Ill.), 160 N.E. 752,* the defendant contended that the trial court erred in permitting certain roentgenograms which had been introduced in evidence and explained

to be taken to the jury room, because they were unintelligible to the average juror. In affirming the decision of the lower court, the Supreme Court held that if they were unintelligible to the jury no injury to the defendant could result and that if the defendant believed that they were unintelligible he might have objected to their introduction in evidence or have required an explanation. The court quoted Sec. 76 of the Illinois Practice Act providing that "papers read in evidence, other than depositions, may be carried from the bar by the jury," and this section has been construed to permit the jury to take roentgenograms introduced in evidence *(Chicago & Joliet Electric Railway Co. v. Spence, 213 Ill. 220, 72 N.E. 796, 104 Am. St. Rep. 213)*. The court further stated that roentgenograms cannot be received in evidence until proper proof of their correctness and accuracy is produced, and finally that the Supreme Court of Illinois has not held that roentgenograms are unintelligible.

In *Hinkelman v. Pasteelnick (N. J.), 130 Atl. 441,* a reversal was sought on the ground that the trial court erred in permitting a physician of the plaintiff to look at a roentgenogram which the physician was unable to say was a photograph of the plaintiff's leg after injury, and to testify that an inspection of the plate refreshed his recollection as to the condition of the bones of the plaintiff; that it was improper to permit him to refresh his recollection by the use of a photograph that he could not identify. The Supreme Court, however, in affirming the decision believed that the objection was without merit, stating that anything that would refresh the recollection of a witness may be looked at by him for that purpose, although in itself it may not be evidential.

## Hernia

THE CAUSES and compensability of hernia, as well as differentiation of it from other conditions, form an important part of evidence introduced in medico-legal cases. Sometimes the decisions are at variance with the prevailing opinion of medical experts, but nevertheless such decisions form precedents and are important from this point of view.

In the case of *Bauman v. Roth Downs Mfg. Co. et al (Minn.) 224 N.W. 459,* the court drew attention to the provisions of the compensation act of Minnesota to the effect that an injury is compensable when it excites, stimulates, or arouses or moves to action an existing latent condition so as to result in disability. The court believed, therefore, that the medical theory of hernia as the result of a disease has little or no bearing on hernia as the cause of industrial disability, and the decision was concerned with the legal cause only. According to the facts the injury caused a weak place in the body to give way; it is not important that the place was normally weak—it was overloaded. It gave way because of the strain and effort in the discharge of the employee's duty, and the injury changed the normal to abnormal, causing a change in the physical structure of the body. The evidence showed conclusively that the injury received while in the performance of duty was at least the incitation—for purposes of the compensation act that is sufficient.

A strangulation of a pre-existing hernia may constitute a compensable injury, according to an Appellate Court of Indiana's reversal of a decision of the Industrial Board against the claimant in the case of *Krenz v. Ferguson Coal Co. (Ind.), 154 N.E. 35.* The Industrial Board was justified in finding that the hernia did not result from the accident described, but it was clear from uncontradicted evidence that there was a strangulation of the hernia when the accident occurred. The court, therefore, held that a strangulation resulting from an accident that was so serious as to require a surgical operation to reduce it certainly was such an injury as should come within the scope of the compensation law.

Inguinal hernia and a rupture have been differentiated by the Supreme Court of South Dakota. *Bayer v. Chicago, B. & Q. R. Co. (S.D.), 220 N.W. 459.* The court stated that "an inguinal hernia is described by medical men as differing from a rupture, in that there is no lesion of the abdominal muscles, but the intestine passes through a natural opening, the inguinal canal, which in normal cases is closed at or about the time of birth by what are termed the inner and outer rings." The plaintiff sought compensation for the development of a complete inguinal hernia under a Federal employers' liability act. The railroad company claimed that if an inguinal hernia develops later in life, it is because of an abnormal condition of the rings and that this condition was, therefore, in the nature of a disease and that such was the case with the plaintiff. The court stated that the employers' liability act does not expressly confine injuries for which compensation may be awarded to injuries by accident, but makes the employer liable for injury or death resulting wholly or in part from negligence. The plaintiff assumed the risks incident to heavy lifting, and even conceding all the evidence favorable to him to be true, the case must fail because of his inability to connect the injury with any negligence on the part of the company. The judgment of the lower court was, therefore, reversed.

## Industrial Poisoning

LIABILITY for industrial poisonings of various kinds is of considerable importance and will probably be more important in the future because of the increasing incidence of occupational diseases and the tendency toward greater coverage by legislation.

In the case of the *Sokol v. Stein Fur Dyeing Co. et al (N. Y.), 216 N.Y. Supp. 167,* the Supreme Court of New York reversed an award made by the Industrial Board for dermatitis which disabled the claimant in respect to the use of his hands. The claimant alleged that he contracted *aniline poisoning;* but to recover compensation under the law he must have been poisoned while engaged in a process involving the use of aniline. The work of the claimant was to handle and brush dry furs after the process of drying and dyeing had been completed. The court stated that the language of the law was descriptive of a chemical process in the fur dyeing trade, involving the application of the chemical to the fur. Since the claimant had not been engaged in making application of the dyes, his case did not fall within the coverage of the law, and he was, therefore, not suffering from an occupational disease; and his claim should be dismissed.

On the other hand, chronic poisoning due to an accident has been rated as compensable, as shown in the decision of *Seattle Can Co. v. Department of Labor and Industries of Washington et al. (Wash.) 265 P. 739.* This case was one of three women poisoned by *benzol* in the course of their employment; the cases were rejected by the department on the theory that the poisoning was not due to any fortuitous event but was in the nature of an occupational disease and, therefore, was not compensable. An appeal was made to the Superior Court of King County which reversed the ruling of the department, and a further appeal was then taken to the Supreme Court of Washington. An important point in the evidence submitted showed that in a process involving covering cans with a sealing compound containing benzol, the fumes had been carried off by proper ventilation previous to 1924; in that year, however, an addition was made to the building and without the knowledge of the employer proper provisions for ventilation were not made. The fumes, therefore, escaped from the oven and in the course of several months poisoned the claimants. According to an expert witness for the department, the claimants were suffering from a chronic condition which could not be construed to be an accident because the poison entered the system over a long period. As the court understood it, the word "chronic" is the opposite of "acute" and "sudden"; an occupational disease is believed to be one which is due wholly to causes and conditions which are normal and constantly present and characteristic of the particular occupation; namely those things which science and industry have not yet learned to eliminate; every worker in every plant of the same industry is alike constantly exposed to the danger of contracting a particular occupational disease. In this case such a condition was not shown—poisoning did not take place until the employed ignorantly or negligently shut off the ventilation, and when the trouble was corrected, no more poisoning took place. Furthermore, no poisoning of similar character has occurred in like plants situated elsewhere. The court, therefore, held that the injuries resulted from a fortuitous event and such an event includes an accident. Although accidents usually occur suddenly, the effect is not always apparent. Although authorities cited from other states are, because of different statutory provisions, not conclusive, in the judgment of the court the great weight of authority tends to support the views previously stated. The judgment of the court below was, therefore, confirmed, and the cases were remanded to the Department of Labor and Industries for classification and award in accordance with the law.

A similar decision was reached in the case of *Sullivan Mining Co. v. Aschenbach (U. S. C. C. A. 9th Circuit) 33 Fed. 2d 1,* in which *carbon disulphide poisoning* was construed to be an accident. The facts submitted showed that the employee was using a thinner which contained carbon disulphide, a volatile substance giving off a poisonous gas. From exposure to this substance the employee developed toxic symptoms until, after a week, he had to be taken to a hospital. Under the Workmen's Compensation Act of Idaho, this was an accident in which the compensation board and not the court had jurisdiction. It is known that the Idaho law provides that "a workman may be said to receive a personal injury by accident arising out of and in the course of his employment when, from the operation of known and usual causes, he receives an injury, neither expected nor designed." It is also a fact that the contention that an injury cannot arise by accident unless it results from a single, sudden occurrence has been definitely rejected in Idaho. The court further stated that the injury in this instance was more in the nature of an acute case of poisoning than that of an occupational disease—that disability resulted unexpectedly and suddenly from an unusual agency —and that the hazard of this unusual agency was not a common incident of a painter's occupational but was fortuitous.

*Carbon monoxide poisoning* of a garage employee was rated as compensable in the case of *Jackson v. Euclid-Pine Inv. Co. (Mo.) 22 S.W. (2d) 849.* In rendering the decision the court stated that a hazard arising from the presence of carbon monoxide gas is one incidental to employment in a garage; this is especially true in winter, when smoke comes from the exhaust of automobiles and the doors of the building must of necessity be kept closed. The court argued that although the deceased had started the motor when the doors of the building were closed, such an action was not wholly dissociated from and foreign to his

employment, for it was designed not only to serve his own personal convenience but to react ultimately to the benefit of the employer as well, as the evident purpose was to keep the deceased warm enough to enable him to continue his work with comfort. Furthermore the hazard was one by no means unusual in a garage, bearing a direct relation to the character of the employment; that it was present in greater or less degree, no matter how carefully the garage was conducted; that the question of negligence whether contributory or sole, is of no consequence in a proceeding of this character, unless it be made to bear upon the question of intentional self-inflicted injury. Therefore, there was sufficient causal connection between the nature of the employment and the hazard which produced the death of the employee to warrant a finding that death was due to an accident arising out of and in the course of his employment and was, therefore, compensable.

In *Dillingham's Case (Me.), 142 A. 865,* the Supreme Judicial Court of Maine reversed an award under the workmen's compensation act in favor of the claimant who had worked in a shoe factory and sustained what he believed was *leather poisoning* as a result of handling wet leather. The court referred to Section 11 of the Workmen's Compensation Act of Maine which provides: "If an employee . . . receives a personal injury by accident . . . he shall be paid compensation." According to this section the court stated that a disease to be compensable must be interpreted both as an "injury" and an "accident." An occupational industrial disease is one normally peculiar to and gradually caused by the occupation in which the afflicted employee is or was regularly engaged and to which everyone similarly working in the same industry is constantly exposed. Apparently the weight of authority is to the effect that cases of occupational and industrial poisoning cannot be regarded as accidents, within the meaning of statutes which provide compensation for workmen in case of injuries caused by accident arising out of and in the course of employment.

### Trauma

SOME states have specific provisions for the compensation of diseases or abnormal conditions following injury; others by interpretation or by court decisions have reached similar conclusions. Therefore, the relationship of trauma to subsequent disease is one of considerable moment.

The claimant who had been in good health previously was engaged in unloading a box from a truck, and the box slipped and fell against him. The only external mark produced was a bruise on the side, and he was placed in the care of his family physician on the same day of the injury, December 9, 1921. His condition became progressively worse, his death occurring October 30, 1923. At autopsy it was shown that there was a sarcoma at a point below the bruise. It is a fact that compensation is payable where death occurs within 300 weeks of the time of the accident, provided testimony shows that it was caused by the injury or an incipient condition was hastened to development thereby. There must be more than a mere possibility of some casual connection, and in this case no other intervening cause with a sudden breakdown appears. The physician who was in charge of the patient stated that he believed that the cancer arose from the injury, that the death not only possibly resulted from the injury, but also was actually caused by it. The competence of this witness was fully shown. The Supreme Court of Pennsylvania, therefore, affirmed the previous judgment and sustained the award under the workmen's compensation act. *(Smith v. Primrose Tapestry Co. (Pa.) 131 Atl. 703.)*

A similar case *(Winchester Milling Corporation et al. v. Sencindiver et al. (Va.) 138 S. E. 479)* contained the decision of the Supreme Court of Appeals of Virginia in affirming an award of compensation under the workmen's compensation act for the death of an employee from sarcoma after an injury to his right side. The court stated that whatever view might be taken of medical opinions, they were frankly and at best theories in this case—the medical theory is that there is a relationship between the receipt of injury and the origin of sarcoma, and that the degree of injury plays no important part. In this instance, however, a perfectly healthy and strong man who had never lost time from work or complained of any illness suffered an injury and from that time on was incapacitated; he grew worse and a sarcoma developed at the point of injury—his death resulted. The court also sustained the opinion of the commission which was in substance that: the general rule clearly to be adduced from the decisions in this type of case is that if the facts show a causal connection between the injury and the development of cancer, then the two cannot be separated, and the victim of the cancer is entitled to compensation; it frequently appears in the reports of these cases that the doctors disagree as to the probable connection between a blow and the development of cancer, but from the standpoint of the compensation act, where a workman is apparently healthy, as was the case here, and able to perform his regular work, and immediately following a severe blow a condition sets up which later turns out to be cancerous, the commission believes that the connection between the blow and such development is clear. The court believed that such decisions will result in the future until the cause of cancer is definitely and scientifically established.

A different situation arose in *Landry v. Phoenix Utility Co. (La.) 124 So. 623.* The facts submitted showed that a piece of timber struck the employee on the chest, causing a double fracture of the eighth rib and a simple fracture of the ninth; after the accident he complained of pains in his side which became more severe in spite of treatment by several physicians. A few days prior to his death a roentgen examination revealed that duodenal ulcers caused his death. Autopsy confirmed the diagnosis and the cause of death, and suit was brought against the employer by the widow. A judgment against the plantiff was sustained and appeal was taken to the Court of Appeal of Louisiana. In commenting on the case the court referred to the fact that all of the experts who testified seemed to agree that the cause of gastric or duodenal ulcers is unknown; that expert witnesses disputed the relationship of the injury to the condition causing death and denied the possibility of ulcers resulting from external trauma; that the pathologist who performed the autopsy confirmed the opinion of the latter experts. In summing up the case the court said, "To the untutored mind of this court it would appear that a severe injury, resulting in the fracture of two ribs, one of them in two places, such as was suffered by the deceased, Landry, would have some causal relation, or would at least have contributed to his demise, which occurred about two months after the injury, particularly since the testimony is to the effect that he had previously enjoyed good health and was not known to complain of any physical illness prior to the accident. But we are not privileged to indulge our impressions in a matter so technical, in view of the expert testimony in the records, which clearly preponderate to the effect that duodenal ulcers, the admitted cause of Landry's death, could not be produced as a result of external trauma. The trial court who heard the experts testify denied the widow's claim, because of the preponderance of the expert testimony against her contention. The Court of Appeal sustained the action of the trial court, because of such preponderance, adding, 'If we and our brother below have erred, the responsibility must rest with the medical profession and not the judiciary.' "

Traumatic pneumonia was adjudged compensable in the case of *Employers Liability Assur. Corp. et al. v. Treadwell (Ga.) 142 S.E. 182.* This was originally a claim against the employer and the insurance carrier for compensation under the workmen's compensation act, which had been awarded by the commissioner and had been affirmed by the superior court. The Court of Appeals of Georgia sustained the judgment of the commissioner and the superior court, stating that the evidence authorized the inference that the deceased had met his death from traumatic pneumonia, which resulted directly from an injury received in the chest when in the discharge of his duties; the injury causing death, therefore, arose out of and in the course of his employment.

The case of *Fraze v. McClelland Co. et al. (Iowa) 205 N.W 737,* was one involving the establishment of medical facts by judicial precedent. The evidence showed that the plaintiff in moving a large and heavy oak door was squeezed against the door, the accident causing him to feel quite sick; later he resumed his work and continued for three days when the condition was reported to the foreman, who sent him to the company physician. The examination disclosed a small red spot on the plaintiff's chest, also unsatisfactory internal conditions in the chest. The plaintiff finally developed tuberculosis and lost weight rapidly, being reduced from 165 to 135 pounds. Two distinguished medical specialists in tuberculosis answered hypothetical questions stating that tuberculosis results from infection and never from traumatism; however they did not deny, but impliedly admitted, that tuberculosis might be accelerated and "lighted up" by traumatic causes, although they testified that the injury in this instance was not adequate to such acceleration or "lighting up." It was on this point that the case really rested. The industrial commissioner had cited decisions from the courts of last resort in three states to the effect that acceleration of pulmonary tuberculosis had resulted from traumatic causes. The Court of Appeals was not disposed to establish or to contradict medical facts by judicial precedent—whatever medical facts may be, as proved in a particular case, they must control regardless of judicial precedent. In this instance, therefore, the court regarded the evidence as close on the question of causal effect, but it also thought that the evidence of the plaintiff was sufficiently preponderant to sustain the allowing of compensation.

An employee in the course of his work became accidentally trapped in a furnace for several minutes and as a result of breathing fumes and gas became physically incapacitated. Prior to the accident he had been in good health. Tuberculosis developed, and according to the report of one attending physician was probably caused by the fumes and gas, although two other physicians reported that this disability was "due entirely to the injury." The industrial commission disallowed the claim, and a subsequent decision by the Court of Common Please reversed the decision of the commission. The case *(Industrial Commission v. Rice (Ohio). 160 N.E. 484)* was taken to the Court of Appeals of Ohio, Erie County, which affirmed the judgment of the Court of Common Pleas, holding that the disease resulted directly from an injury sustained in the course of employment and was not an occupational

disease—it was compensable on the theory that the condition was caused by the injury. Although there was some evidence to the contrary, the Court of Appeals believed that the Court of Common Pleas was warranted in finding that the incapacity to work and the tuberculosis resulted directly from injury caused by inhaling injurious substances.

A somewhat different decision was reached in *Rushonosky v. Lehigh Valley Coal Co. (Pa.) 141 A. 851.* This was an appeal from the judgment of the Court of Common Pleas to the Supreme Court of Pennsylvania. The husband of the appellant was accidentally injured in the course of his employment on August 16, 1923, and died January 8, 1927, of pulmonary tuberculosis. It was claimed that the death was due to the accident, the referee finding in favor of this claim, but the compensation board had reversed the findings. In cross-examination, the only physician called in the case testified that the accident could be a contributory cause of death and that it very probably was, and upon further questioning said that a chest injury could light up a smoldering tuberculosis. However, he finally made a statement to the effect that he could not say that the injury of 1923 caused the death in 1927, but it probably did, and in that particular case he suspected that the injury had been the cause. The compensation board had previously held that such testimony was not sufficient to establish a causal relation between the injury and the death—the Court of Common Pleas sustained the board's findings.

### Miscellaneous Cases

THE NUMBER of miscellaneous medicolegal cases coming up for decision within any period of time is obviously quite large. A few of the representative ones will show the extensive scope and variety of the subjects.

A caustic acid has been construed as a cause for detachment of the retina as shown in the case of *Cumberland & Alleghany Gas Co. v. Caler (Md.) 146 Atl. 750.* The medical evidence submitted was to the effect that acid had splashed into the remaining good eye of a workman during his employment—he had already lost the sight of his left eye as the result of a previous accident; the vision deteriorated after the acid splash until at the time of the trial he could hardly tell the difference between light and darkness. The claim for compensation was disallowed by the industrial accident commission, but on appeal to the circuit court the jury found in his favor, and judgment was entered reversing the order of disallowment. The employer and the insurer then appealed to the Court of Appeals of Maryland, contending that the expert testimony offered by the workman himself showed that the injury only could have resulted from the splashing of the acid into his eye, whereas medical experts testifying on behalf of the defendant stated that it did not result from that cause. The court said that the medical evidence alone would not have been sufficient to take the case to the jury, but that there was other testimony from which a reasonable mind could infer that the injury did result from the cause assigned. The court reasoned that if it was true, as testified by the appellee, that the workman's eye had been good except for nearsightedness up to the time of the accident and that it deteriorated from that time on, it would be a strange coincidence that it began at that particular time if there was no connection between the two occurrences. The judgment of the court below in favor of the workman was therefore affirmed.

The Supreme Court of Wisconsin affirmed the judgment relative to an award of compensation for the death of an employee in a tannery, demise being caused by an infection of the liver by the actinomycosis fungus, *(Pfister & Vogel Leather Co. v. Industrial Commission et al. (Wis.), 215 N.W. 815).* In the previous hearing before the commssion, the decision depended largely upon the testimony of the three physicians who presented the medical evidence, and, as is usually the case when physicians are called by opposing parties, they did not agree. There was, however, substantial accord in the testimony as to the fundamental facts involved, and the differences could be ascribed largely to the degree of certainty with which they testified to facts determining the liability. All agreed that there was at least a possibility that the employee was infected with the germ from hides handled in the tannery. The court stated that it is often impossible to find a source from which a germ causing disease has come, but that under such circumstances the industrial commission or the court can base its findings on a preponderance of probabilities or of the inferences that may be drawn from established facts. It is important to note that the evidence presented three methods by which the germ, if contained in the hides, might have been communicated to the employee: *first,* by being carried through the air; *second,* by being carried on the hands or clothing of the man who handled the hides and then communicated to the employee in question by personal contact; *third,* by direct contact with the germ when the employee was trimming the flesh from the hides. The proof established the fact that death was caused by the infection of the actinomycosis fungus—the employee must have been exposed to the germ at some place—the inferences preponderated in favor of finding that he was exposed to the germ in the employer's tannery—therefore the preponderance of inferences was so great that the commission could say that it amounted to a reasonable certainty.

The case of *Carpenter v. Pacific Mut. Life Ins. Co. (Wash.), 261 Pac. 792* involved the contracting of abrasions on the hands and subsequent infection through them. The policy provided for indemnity against loss of life, limbs, or sight "resulting independently of all other causes, from bodily injuries effected through external, violent and accidental means." The medical evidence showed that the insured died from septicemia after skinning one of his sheep which had died, and at the same time he had abrasions on his hands; after completing the skinning he washed his hands and applied carbolic salve as a disinfectant, according to his usual custom. Death occurred within five days. The court reasoned that the germ entered from the outside, therefore it was external—it was forced into the circulatory system, therefore entered by violence—entry was not intended nor expected, therefore it was accidental. Several similar cases when carefully read support the contention that the infection itself was an accident, within the terms of the policy, although some authorities hold to the contrary on facts differing but little from those shown in this case. The court concluded that the plaintiff was entitled to a judgment for the amount of the death loss fixed by the policy.

Spinal arthritis as a sequel of back strain was the subject matter involved in *Biker v. Industrial Commission et al. (Ill.) 160 N.E. 180.* The injured had been awarded compensation for temporary total incapacity for work under the compensation act. Later he petitioned to have the award reviewed, alleging that disability had recurred and increased; the petition was denied by the industrial commission, but after a review of the findings of the commission, the circuit court reversed the decision, holding that the injury had recurred and increased, rendering the injured totally and permanently incapacitated. Thereupon the employer carried the case to the Supreme Court of Illinois. The injured alleged that on March 4, 1922, his back was wrenched in the performance of his duties, and it was on this basis and because of other alleged injuries that the initial award was affirmed by the industrial commission May 11, 1923. The medical evidence submitted through physical and roentgen ray examinations made by three physicians separately, on and before May 4, 1922, had failed to disclose disease or injury of the spine. Examination subsequent to the injury showed that the lumbar curve was decreased, and there was a possible, but not positive, increased tenseness of the left lumbar muscles in the upright position; no fixation of any portion of the spine in stooping was noticed and there was no tilting of the pelvis. Roentgen ray examinations made in May, July and October of 1924 showed an advanced ankylosis between the last thoracic and first lumbar vertebrae, with arthritic changes involving particularly the transverse processes on the left side, in the second and third lumbar vertebrae. There was a slight torsion of the fourth lumbar vertebrae, and physical examinations showed a stiff back or rigid spine. No other organic trouble of any kind could be found. It was shown that the injured could not read or write the English language and had never had any schooling in his own language, except a half year. The court held that he was clearly permanently injured and incapacitated for any manner of work in which stooping and lifting are involved—that the award of the circuit court based on total and permanent disability had not been excessive —and that the judgment of that court was affirmed.

Electric shock, followed by tardy death from pulmonary edema in reference to workmen's compensation provisions was the subject of the case of *Hosman Coal Co. v. Carr et al. (Ky.) 16 S.W. (2d) 167.* The deceased had been shocked by coming into contact with an electric cable, in the course of his work. He continued to work for that day and for two weeks thereafter until the mines were shut down for a short period of time. He did not return when the mines reopened and died approximately three months after the injury.

The employer had introduced evidence to show that the claimant died from tuberculosis contracted prior to the accident. However, the claimant introduced evidence to show that the deceased suffered from asthma prior to the electric shock—that he did not have tuberculosis—and a physician testifying in behalf of claimant showed that the death was due to pulmonary edema caused by electric shock as noted. The Court of Appeals of Kentucky sustained the finding of the workman's compensation board that death was due to the accident—the award of the board as modified by the circuit court was therefore affirmed.

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## Special Fracture Technique

FRACTURES of the mandible and maxilla have assumed great importance recently because of the increase in the number of automobile injuries. From experience with 1100 such injuries, Drs. L. Rogers, C. T. Hall and J. H. Shackelford, of Detroit, favor the procedure which is known as interdental wiring. The advantages of this procedure are: (1) normal or original occlusion, correctness of median line, and harmony of facial expression are obtained; (2) only a few instruments and 28-gauge wire are required; (3) interdental wiring requires less time than the making of splints; (4) interdental wiring is not annoying to the patient; (5) this procedure is the most accurate and dependable of all methods.—Abstr., *Radiology* and in *Clinical Medicine and Surgery.*

# Our Problem Page

## —III. Arsenic Poisoning—

*THIS is the third of a series of articles in which important problems of industrial medicine and hygiene will be discussed. In the form to be used, the problem in its essentials will be briefly stated, and the discussion will follow. Suggestions from readers will be welcomed and given due consideration in the selection of future subjects.*

PROBLEM: Please give some information concerning the commercial uses of arsenic, the occupations in which arsenic and its compounds usually cause poisoning, symptoms and clinical findings, and the prevention of arsenic poisoning.

DISCUSSION: The various industries and types of manufacturing in which arsenic compounds are used are as follows: arsenic mining; the manufacture of glass; roasting of arsenic-containing ores; shot manufacture; metal working; the manufacture of arsenic colors, including the preparation of dyestuffs, textile printing, and dyeing; manufacture of wallpaper and other colored papers; tanning; the making of oil cloth and artificial flowers; taxidermy; various types of painting and decorating; and the manufacture of fireworks. It should be remembered that various metals, such as zinc, silver, lead, bismuth, and copper contain arsenic as an impurity, and the same principle is true for most of the commercial acids.

### Occupations Affected

A PARTIAL but not exhaustive list of the occupations in which there is exposure to arsenic and its compounds and which are most productive of arsenic poisoning is arsenic roasters; artificial flower makers; bookbinders; candle makers (working with colored products); carpet makers; carroters of felt hats; chargers in zinc smelters; color makers; colored paper workers; compounders of rubber; copper founders; copper smelters; curriers in tanneries; cut glass workers; decorators of pottery; dye makers; electroplaters; enamelers; feather curers and workers; felt hat makers; ferro-silicon workers; fur handlers and preparers; galvanizers; gardeners; glass mixers; glaze dippers and mixers in pottery; gold refiners; insecticide makers; japan makers; jewelers; lead smelters; linoleum color workers; lithographers; mixers of rubber; mordanters; paper glazers and hangers; pencil makers working with colors; pitch workers; pottery workers; press-room workers in rubber; printers; pyrites burners; refiners of metals; rubber tire builders and workers; sealing-wax makers; sheep dip makers; shot makers; sprayers of trees; sulphur burners; sulphuric acid workers; tannery workers; taxidermists; tinners; toy makers, velvet makers; wallpaper printers; wax ornament makers; wire drawers; wood preservers; and zinc miners.

There is also a number of industrial employees exposed to arseniureted hydrogen, one of the dangerous forms of arsenic; these persons include: acid dippers; aniline workers; toy balloon fillers; dry battery makers; bronzers; carbonizers of shoddy; dimethyl sulphate makers; dye makers; enamelers; ferro-silicon workers; fertilizer makers; galvanizers; lead burners; lime burners; nitroglycerine makers; picklers; refiners of metals; shoddy workers; submarine workers in storage batteries; sulphuric acid workers; tinners; towermen in sulphuric acid manufacture; and zinc chloride makers.

(The list referred to above has been adapted from "Occupation Hazards and Diagnostic Signs," by Dublin and Leiboff, published in *Bulletin* No. 306, U. S. Bureau of Labor Statistics, 1922.)

### Symptoms and Clinical Findings

BRIEFLY, the symptoms of arsenic poisoning are pain in abdomen, which is usually violent; the occurrence of gas in the stomach; a great deal of nausea which is followed by vomiting of large quantities of fluid; severe diarrhea; a diminution in the daily quantity of urine passed; headache with dizziness; muscular cramps; clammy skin; and feeble pulse. In serious cases, there is prostration followed by collapse and coma, and death may occur in 24 hours. The above is a typical clinical picture of acute arsenic poisoning.

In chronic arsenic poisoning, there is first weakness and general fatigue, with loss of appetite; general gastric discomfort occurs, either with diarrhea or constipation; nausea with or without vomiting is usually present. In the second phase of the chronic type of arsenic poisoning a common effect is inflammation of the mucous membranes of the body; this usually begins with an inflammation of the eyes or the nose. Sometimes a cough develops. There is generally hardening and toughening of the skin, particularly of the hands. In some cases, especially in brunettes, there is a noticeable bronzing of the skin. The hair may fall out or the nails become disfigured. There may be blisters and limbs may swell.

In the so-called third phase of chronic arsenic poisoning there are marked disturbances of sensation in the hands and arms, and feet and legs. There is intense headache. Sometimes, there are pains in the joints. Occasionally these pains are so severe that even the pressure of bed clothes causes great discomfort. Paralysis develops in the muscles in the back of the legs and the muscles of the feet; this sometimes spreads to the arms and hands.

As in exposure to mercury and lead, some workers seem to be immune to the effects of arsenic, while others are very susceptible.

### Prevention

THE prevention of arsenic poisoning is relatively simple if certain procedures are followed, such as:

1. Thorough sanitation methods. All men coming in contact with white arsenic, the acids of arsenic, or arsenical compounds of any type should be instructed to take a shower bath upon completion of work before going home. The shower room should be provided with hot and cold water for every four men.

2. Any plant in which there are manufacturing processes inviting exposure to arsenic compounds should be well equipped with dust collectors and ventilators, but in addition to this, all men working on dry products containing arsenic should be provided with, and instructed in the use of adequate respirators.

3. All workmen should be instructed to wear cotton gloves or leather mittens; leggings or bicycle clamps at the bottom of their trousers; or in certain cases, light water-proof aprons.

4. Workmen should be instructed to cover all tender portions of the skin, both exposed and inexposed (such as the armpits) by a coating of ointment.

5. The skin of exposed workmen should be inspected regularly for the occurrence of abrasions, cuts, or scratches on the exposed surface; if found, these areas should be properly protected, and in case infection develops the services of a competent physician should be procured.

6. So-called arsenic "burns" may be treated with an alkaline wash immediately followed by bland ointment. Where burns escape notice and develop into sores, moist dressings of an antiseptic solution may be used; all such cases of "burns" in areas of soreness should be promptly treated by a physician, because serious effects may result from the absorption of arsenic unless adequate and prompt medical attention is secured.

7. As a preventive measure against arsenic poisoning, all workers should be instructed to drink very liberal quantities of milk with their meals and take a cathartic or a mild laxative at least once a week.

8. It has been found that warm water has a tendency to promote arsenic "burns." In taking showers, therefore, the men should first wash the dust from their bodies with cold water and then take a warm cleansing shower.

### Summary

ARSENIC and its compounds are widely used in industrial processes.

2. The use of arsenical compounds covers a wide variety of occupation in which adequate protection should be provided.

3. Arsenic poisoning may be acute and cause death in a comparatively short time. Chronic arsenic poisoning may extend over a long period of time with varying degrees of incapacity. Simple hygienic and sanitary methods can reduce arsenic poisoning if properly followed, and through such means control can be exercised so that the actual number of cases will be few. The responsibility of the employer lies in providing devices that will keep workmen protected from exposure which produces poisoning. The responsibility of the employee is limited largely to the proper use of devices provided, to personal cleanliness, and the use of common sense.

4. It is important that there should be early recognition of arsenic poisoning and prompt treatment to lessen incapacity and serious results.

5. The matter of susceptibility calls for the exercise of considerable judgment and observation; when a man is found to be particularly susceptible to arsenic and its compounds he should be removed to other work.

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## The Therapeutic Use of Oxygen

*By* J. I. BANASH

*Consultant*

*Chicago*

NOW that oxygen has been so widely used to correct oxygen deficiency in many forms of disease, a brief review of the mechanical features may be interesting to industrial physicians. The fears and misgivings that often arise when oxygen is used, since the latter until recently was known mainly to the public as a last resort, should disappear with the incoming generation, so that it will be more accepted as a routine treatment rather than only an emergency measure.

In a practical way physicians depend upon cyanosis for the clinical indication of oxygen want, although in some medical institutions oxygen is given statistically, so to speak, in a number of conditions. Many well-informed doctors now seem to feel that early

application of oxygen materially increases its value as a therapeutic agent. It has been used successfully for treatment of pulmonary edema and pneumonia and later has been extended as an aid in the treatment of certain forms of heart disease, where an acute coronary thrombosis or other decompensation exists, which lowers the oxygen saturation of the arterial blood.

The usual therapeutic concentration of oxygen is in the neighborhood of 50%, although in some cases, particularly at high altitudes, greater concentrations ranging up to 70% have been used.

A point of interest to industrial physicians is that most industrial plants have available at all times, oxygen meeting the requirements of the United States. Pharmacopeia, in large, high pressure cylinders. Reducing valves for safely drawing oxygen out of these cylinders are also part of industrial equipment and this makes it practicable for the industrial physician to give oxygen treatments without loss of time where they are indicated.

OXYGEN THERAPY was delayed for many years, because of lack of suitable equipment at reasonable prices, but now such materials are generally available and the technique of application worked out and all of this is being supplemented rapidly. There is reasonably comprehensive literature available, most of it of quite recent origin and largely built around actual clinical application of oxygen therapy. The modern methods of treatment may be summarized as follows:

The best medical opinion is that the oxygen chamber is the preferred method of treatment. A permanent oxygen chamber with which some of our modern hospitals are equipped, keeps the patient in a bright, attractively furnished, sunny room, in which the temperature, humidity, carbon dioxide percentage and oxygen concentration can be accurately controlled. The patient can rest comfortably while enjoying complete medical and nursing care. There is also a type of portable oxygen room which can be set up in a private home.

The most general medical opinion is that a modern oxygen tent is the next in order of effectiveness. Such equipment is rather generally available; it is portable and is quickly and easily set up over the bed, either in the hospital or at home. Manufacturers working in conjunction with the medical authorities have given much time and thought to the development of the modern oxygen tent, with the result that a high degree of effectiveness has been obtained. Present tents utilize a rubberized fabric canopy with ample window space, suspended over the head, shoulders and chest of the patient, providing him in comparative comfort with oxygen-enriched atmosphere as in the permanent chamber. A cabinet beside the bed to which the canopy is attached, takes the atmosphere from the tent, cools and dehumidifies it, removes excess carbon dioxide if necessary, adds more oxygen and circulates the atmosphere at the desired temperature. Either thermal circulation or some form of mechanically induced circulation is employed.

A large number of hospitals are equipped with oxygen tents and in many cities there are companies that rent tents to patients in hospitals or private homes. Such companies supply the tents and the oxygen and expert technicians capable of carrying out the instructions of the doctor in charge of the case.

Oxygen chambers and oxygen tents are intended to supply oxygen concentrations continuously within the therapeutic range with relative humidity of the atmosphere maintained below 50% and at a reduced temperature. They are also designed to maintain the carbon dioxide content at a low point and are equipped to raise the carbon dioxide content by addition of this gas from a cylinder, when so ordered by the doctor for special conditions.

WHEN oxygen chambers or tents are not available or for some reason cannot be used successfully, even if available, a catheter is often employed effectively. Usually a number 8F or 10F very flexible catheter with extra holes punctured near the end is used. When employing the deep insufflation method, the catheter is lubricated and with the oxygen flowing, passed through the patient's nose into the oral pharynx so that the tip hangs about level with the uvula. Oxygen is fed at a rate, determined by the physician, suitable to give the desired therapeutic effect. Usually, the oxygen is bubbled through water so as not to dry out and irritate the nose and throat.

The use of a face mask or nasal inhaler is somewhat similar. These three methods naturally are easier to administer with the cooperation of the patient and the equipment needed is simple, inexpensive and has no doubt saved many lives.

Oxygen conforming to the standards of the United States Pharmacopeia, and marked, "U. S. P.," in large, commercial cylinders, under pressure of 2000 pounds per square inch. is generally available in welding shops, garages, factories and railroad shops. Safe, accurate and reliable reducing valves are also readily available to control the high pressure and deliver the oxygen at the desired rates of flow to the administering apparatus, so that doctors throughout the country can always give oxygen when their patients need it.

Oxygen in medicine is a fascinating subject, both from the viewpoint of therapy and the mechanics of application and we shall hear much more of it.

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# EDITORIAL

## Medical Relations and Compensation

IN THIS issue (p. 101) will be found an abstract of an important report "Medical Relations Under Workmen's Compensation," recently issued by the American Medical Association. The ramifications of this excellent treatise are so varied and the implications so far reaching that a single editorial cannot even cover the highlights. The report should be carefully read and studied. A few comments may be of interest.

"A large percentage of the evils that have grown up in compensation medical practice can be traced to efforts to produce medical service with instruments primarily intended to produce other goods and profits. It is somewhat as if a packing house should try to produce cutlery, or foundries to turn out legal services, without changing equipment. The character of the desired product must be the determining factor in any organization, and the success of the organization is judged by its product. The product aimed at by an efficient system of medical care is such personal relations of the patient with the physician as will best restore and maintain health, and any such system must center around this objective. Every question that comes up must be decided according to this test."

This is a clear view of the issues involved and can be used as a criterion in the evaluation of the many problems that arise.

Of great significance is the statement, "The ablest, most professionally ambitious and conscientious of its practitioners (industrial medicine) constantly complain of the indifference of the profession and medical schools to the significance of industrial causes of disease. It can never be otherwise so long as compensation practice is a closed corporation dominated by economic motives and maintained by compulsory patronage. Physicians outside the closed circle who note the increasing dominance of economic considerations and the rapid growth of such undesirable forms of contract and clinical practice as have been described come to look upon compensation practice as a threat to all medical ideals and to the existence of individual practitioners. They will, therefore, tend to underestimate the importance of industrial relations on disease and its treatment. They will oppose the introduction of such subjects into the curriculums of medical schools so long as compensation practice is so closely monopolized in forms repugnant to traditional medical ethics as to make education of little benefit to the profession as a whole."

For years attempts have been made to establish medical boards to work in conjunction with industrial commissions. As the report indicates, "It is important that in every state medical society there should be an active committee devoted to the study of the problems of industrial medicine. Whatever compensation laws exist, this committee should be in close and continuous contact with the administrators of compensation, to the end that medical subjects be presented from the scientific professional standpoint and that all physicians may be kept fully informed of any questions at issue."

It would seem that if compensation systems are to survive, the active participation of the essential figure, the physician, should come to be an established fact.

## Gaining New Knowledge

IN THE July issue of *Industrial Medicine* (p. 58) Dr. Henry Page, who has had extensive experience in insurance and medical problems, calls attention to some of the perplexing situations which occur in the defense of suits in compensation and court proceedings.

An insight into some of these problems may be gained by qouting from an article in the same issue (p. 24) as follows: "One of the chief difficulties besetting the casualty company of today is the lack of real actuarial experience upon which to base the estimate of a health hazard. There are no comparable data available, such as we have in accident experience, and of course nothing which can approach the mortality experience of the life insurance companies. One of the reasons for this lack of evidence and experience is the inadequate system of reporting cases of industrial poisoning, because state departments of

health or other agencies have not been able to inaugurate reporting systems which function properly. There are a few exceptions to this statement, but they are so small in number that no possibility of a national experience and analysis is afforded. Another cogent reason is the lack of interest on the part of manufacturers, or the fear that they would be exposed and penalized if such reports were made." Reference is also made in this article to the method of determining the existence of health hazards in industry. While it is true that this material pertains especially to the prevention of cases of health injury in industry, the implications involved are directly associated with the defense of compensation cases.

In considering such defense we are largely dependent upon medical data which are sometimes very meagre and sometimes not available to such an extent that they could be considered adequate to cover the situation. However, certain investigators have emphasized that the opportunity to gather this kind of knowledge bulks large and may be afforded through two channels: one, by the development of well-supervised and planned laboratory investigations which should yield information regarding the pre-clinical manifestations of industrial disease, and also material which would permit of greater accuracy in differential diagnosis of compensation cases, leading to the expression of more positive medical judgment in regard to causal relationships; the other relates to the possibility of using clinical material and records gained through the experience of compensation bureaus—here the subjects which are possible of investigation are those concerning the relation of trauma and disease and the effects of each on the other.

Is there not considerable significance in the fact that the whole compensation system has been built up almost entirely on the surgical side to the neglect of the experience available through industrial toxicology and the pathological manifestations of non-surgical conditions? This concept gains particularly in importance when it is known that approximately 60% of health hazards in industry originate in chemical substances and processes. This does not mean that industrial surgery is not important and should not continue to assume its proper place in industrial practice; it does posit the principle however that more emphasis should be placed on industrial disease conditions, and definitely implies that the large body of information which is now available on this subject should be put to good use. Nor can it be said that more research is not needed, for this is attested by those who have had the most experience in this field.

The defense of claims on the other hand is a procedure which is remedial in type and which occurs when it is too late for prevention. It has been observed by those who have had considerable experience in defense that the chief difficulty lies in the transmission of available knowledge in terms such as can be appreciated by attorneys and commissions, and further explaining the technical points in such a way that a jury or commission of laymen could have no doubt as to the meaning of the statements made. Another important point in defense procedure is reliance on physicians who are thoroughly qualified in the field of industrial medicine, especially those who are acquainted with available information and where it can be obtained.

The problem is therefore not a hopeless one but calls for the due consideration of what we know and the studious application of this knowledge even when considered in the light of its limitations.

## Experimental Pathology in Silicosis

PATHOLOGY is considered one of the most exact and exacting of the medical sciences. Without a comprehensive understanding of the changes which are expressed in terms of morbid anatomy, the clinician cannot have a secure foundation for the proper interpretation of symptoms and physical findings, thus leading to a definite diagnosis.

These ideas are especially applicable to our experience with silicosis, which, although not a rare disease, does not occur with sufficient frequency to enable any considerable number of physicians to gain extensive clinical acquaintance with this important industrial disease entity; nor have the number of necropsies been of such an order as to provide adequate material for study by the large group of pathologists and clinicians desiring exact scientific data in this country.

The experimental pathologists, therefore, can be of great help in solving many problems during a comparatively short period of time that would otherwise consume many years of effort in the patient collection of observations and their interpretation, which would quite likely even then leave many gaps in our knowledge.

Furthermore, in experimental work there are many conditions subject to proper control not possible when working with human subjects. Such phenomena as atmospheric concentration of dust, inhalability, retention, focalization, duration of contact with the tissues, pressure and mechanical injury, physico-chemical composition and coexistant infection are practical examples of this principle, as is shown in the excellent discussion by Dr. Leroy U. Gardner, pp. 27-32 of *Industrial Medicine* for July, 1933.

The possibility of error in the comparison of experimental pathological changes with those occurring in human beings has already been mentioned by many

scientific observers. It is the duty of the experimental pathologists however to interpret findings in such a way as to allow for fundamental differences. Repetition and confirmation are the necessary principles to follow here, as is well known.

A great deal of the information concerning the pathology of silicosis is now widely accepted as being on a scientific basis, but as Gardner has indicated there are still a number of desirable etiological relationships to be established. One of these is the part played by mixed dusts and the possibility of certain varieties acting as neutralizing agents against the deleterious influence of free silica.

The experimental pathologist can, therefore, be of invaluable service to the clinician by supplying data which under present conditions can be secured from no other source.

## A Canadian Experience

THERE ARE few departments of health run by states or cities or provinces that provide any type of advisory service in industrial hygiene. The province of Ontario, Canada, is an exception in this respect and under the direction of Dr. J. Grant Cunningham, who is the Director of the Division of Industrial Hygiene, an excellent type of service is being rendered.

To give a concrete idea of the activities of this division, certain paragraphs are quoted from the report of the year, 1931:

"Surveys among selected groups of workers exposed to dust involved 450 examinations with x-rays to determine the influence of various exposures, including grinding, polishing, porcelain manufacturing, moulding and preparation of abrasive cleaners. Silicosis had developed among workers in all these occupations.

"Of some interest and perhaps of importance here is the result of the examination of a small group of workmen preparing batches of sand, lime and soda ash in glass bottle manufacturing. Dust exposure was high and for periods as long as nine years, but only early lung changes due to silica were present. The number exposed was small and the turnover among them low. Another group of 12 men preparing abrasive cleaner, all for nine years or more, with heavy exposure to silica and alkali, were two cases of early silicosis and two cases of tuberculosis—one of them moderately advanced after 17 years in this work. The findings in these groups suggest that simultaneous exposure to silica and alkali can take place without the rapid development of silicosis which has been reported elsewhere.

"A larger group of workmen exposed to a high concentration of gypsum dust showed no increased fibrosis of importance, although there was fairly constant slight increased shadowing in the x-ray over the lower one-third of the lung fields which might be due to dust. No autopsy examination was made. Within this group were two cases of tuberculosis and four others with some suspicion of tuberculosis. This hardly suggests protection from tuberculosis due to the inhalation of a calcium product.

"Of eight men exposed to asbestos dust, three showed a minor increase in lung fibrosis and one was moderately advanced with no tuberculosis. However, the longest exposure in this group was 11 years. Workers in moulding, grinding and in vitreous enamel spraying in the manufacture of stoves require additional safeguarding.

"The findings in all survey examinations are communicated in person to the plant physician. Where the examinations indicate the presence of a hazard, the composite findings are submitted to the employer with recommendations for the control of the hazard, including subsequent examinations, provided by the employer, where this is considered desirable."

These few short paragraphs express in a very forcible fashion the extreme care and scientific attitude given to the study of industrial hygiene and occupational diseases within the province of Ontario, Canada.

Perhaps some of our industrially developed states in this country might well take note of this excellent example and attempt to duplicate the fine work of our Canadian neighbors.

## An Industrial Problem

THE REQUIREMENTS of industrial practice are increasing. The spread of occupational disease legislation, the increasing recognition of the importance of the physical examination and the increasing frequency with which employees consult the plant physician, make his burden more onerous than before. Industrial physicians released from their positions during the past three years have, to a large extent, established themselves in private practice and are reluctant to reenter the industrial field now that there is a possibility of doing so. It is to be hoped that chief surgeons, faced with the problem of recruiting assistants, do not fall into the habit, too prevalent among industrial managers, of hiring the first applicants that present themselves. Extreme care in the selection of the medical personnel will repay the chief surgeon and the management in a far greater measure than the false economy promised by the lower salary demands of inexperienced staff members. Now is the time to assert the necessity of adding the best type of medical personnel to the payroll in order that the increasingly expensive health problems of industry may be adequately met.

# Industrial Medicine Digest

### Back Pain and Back Injuries

DR SUMNER M. ROBERTS *in National Safety News*: — The importance of back injuries can be realized when it is known that in New York state in the year 1930 this type of injury was the immediate cause of 25% of all lost-time cases; it is also stated that 7,683 workers received compensation for back injuries in the state of New York. In various experiences, it has been shown that the time lost totals 800 working years and represents a wage loss of $1,854,000.

For practical purposes the causes of back pain may be three: (1) organic disease; (2) mechanical causes; and (3) trauma.

Under the heading of *organic disease* comes cancer, tuberculosis, arthritis, kidney and pelvic disease, syphilis, osteomyelitis and various foci of infection. The treatment is purely a medical problem in this series of causes. Prevention consists in detection by physical examination, before the disease has progressed to such a stage as to be incurable or to become chronic.

*Mechanical causes* include poor posture, fatigue, the so-called wrong body type, and certain abnormalities of structure. The treatment for these causes embraces physical education for poor posture; rest for fatigue; and special orthopedic procedures for various abnormalities in structure. There is no treatment for the so-called wrong body type, which is not a disease. Preventive procedures include proper working conditions, such as seats, lighting, floors, hours of work, etc.; the fitting of the man to the job; and x-ray and physical examinations for detection of the various mechanical causes.

Under *trauma* are included bone injuries, joint and ligament injuries, and muscle injuries. The treatment of bone injuries is a special orthopedic problem; for joint and ligament injuries rest and orthopedic aids are indicated; for muscular injuries, rest is necessary and the use of graduated exercises. The prevention of these injuries is highly variable in relationship to the different types: general methods of lowering industrial hazards apply in regard to bone injuries; joint and ligament injuries cannot always be prevented but must be diagnosed when they occur, making use of x-ray and other diagnostic procedures; proper early treatment will prevent muscular injuries becoming chronic.

In summing up, an ideal procedure is suggested: the applicant for employment is first given a thorough physical examination by a competent physician and his posture noted. If it is such as to materially weaken his bodily efficiency he will be considered unfit for heavy labor; furthermore his general body type will be recognized and he will not be assigned to tasks for which he is not fitted. An x-ray of his back should be taken to rule out hidden defects. Proper stools and benches will be provided, the lighting will be good, the floors will be kept dry and free from debris; if required to do heavy lifting, he will be shown how best to apply his body in the task; mechanical aids for heavy lifting should be provided; the avoidance of fatigue will be possible through control of overtime work.

If in spite of all of the precautions the worker is injured he will be sent immediately to a competent physician who will carefully examine and x-ray him and prescribe treatment. When the acute symptoms have subsided, he will first be given light work and not returned to heavy labor until he is physically and mentally ready for it.

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### The Medical Department and Safety

DR. A. F. LECKLIDER *in National Safety News*:—The author discusses the relation of medical activities in industry to the promotion of safety quoting an editorial from the American Medical Association as follows:

"Even the prevention of accidents, it is now gradually becoming recognized, is dependent more upon mental and physical examinations and placement of employees than upon mechanical safeguards, shop discipline and safety first crusades."

As the author well states, " there may be some who are still mechanical in their attack on the problem and who prefer to bolt a safeguard to the metal rather to inject ideas into the cranial cortex. With these I frankly take issue. To me the guard is a gesture, an evidence of good intentions but simply a minor part of the program which should have for its object safety consciousness in individuals known to be mentally qualified to harbor an idea."

Occupational diseases and their prevention are of considerable importance. The most logical means of prevention is the substitution of a nontoxic agent for a substance which has been shown to be a previous cause of difficulty. The second method is inspection and ordering of working conditions, and periodic examinations where known hazards exist.

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### Occupational Skin Diseases

DR. KARL G. ZWICK *in The Ohio State Medical Journal*:—In some states and in some foreign countries, occupational skin diseases are responsible for the greatest number of claims filed. For instance, this type of occupational affection was responsible for 60% of the total number of cases reported to the Industrial Commission of Ohio for the years, 1927, 1928 and 1929; in Connecticut for the year 1928 the percentage was 58; in Massachusetts for 1927, 36%; in New Jersey for 1928, 30%; and in New York for 1930, 20%. German figures show that of from 50 to 70% of industrial diseases in general, industrial dermatoses are the source.

It is quite likely that the variation in percentage is due to local manufacturing conditions and differences in exposure to products causing irritation.

The occupations which are chiefly responsible for the production of a large number of cases of skin irritation and dermatoses are cited by Dr. Zwick as follows: (1) domestic work—laundry workers (soap washing powders, alkalies, water, heat, insecticides, cleaning fluids); (2) laborers (exposure to cold, water, chemicals, cement, lime, tar); (3) printers, engravers, lithographers (turpentine and substitutes, benzine, colors, rosin, cleaning agents, acids); (4) painters, plasterers, bricklayers paperhangers (turpentine and substitutes, benzine, plaster, cement, paste); (5) cloth and fur workers, tailors and cleaners, milliners (dyes, mordants such as chrome salts); (6) metalworkers, jewelers, electroplaters (lubricating oils, polishes, acids, solutions of metal such as cyanides, metal dust); (7) chauffeurs, automechanics, gas-station atten-

dants (gasoline, cleaning fluids, lubricating oils, paints, varnish, denatured alcohol); (8) barbers, cosmeticians, morticians (soap, water, denatured alcohol, hair-dyes, scalp lotions, dry-shampoo, fluids, embalming fluids); (9) oil and grease workers) fats and oils handled in different trades); (10) bakers, confectioners, cooks, butchers, grocers (flour, dough, sugar, meats, rabbits, salt); (11) physicians, dentists, nurses (soap water, disinfectants, antiseptics, alcohol-denaturants, x-ray, anesthetics); (12) tanners, shoemakers, and other leather workers (lime, chrome salts, formaldehyde, dyes, fungi, tan-liquors, salt); (13) chemists and druggists, photographers (numerous chemical and drugs, developers); (14) gardeners florists, farms (irritating plants, insecticides, fungi); and (15) woodworkers (special woods, solvent for varnish glue).

The author compares different methods of testing the skin for susceptibility, which he calls the "tolerance probe." The limitations of this technique are also explained.

In summary it is stated that:

"As occupational skin-diseases have always been with us and as the incidence of industrial skin-diseases continues high, notwithstanding the introduction of labor-saving machines which reduce the frequency of contact with harmful substances, additional prophylactic measures seem necessary besides those suggested by McConnell, R. Prosser White, and others which retain their usefulness.

"It is suggested that a cutaneous tolerance probe may be useful: (a) to detect eczematogenic substances; (b) (sensitiveness, idiosyncrasy) in applicants for work.

"The cutaneous tolerance probe is suggested as an additional measure for determining the fitness of an individual for a specific job, besides the customary routine physical examination of the body in general and of the skin in particular.

"In the United States Public Health News bearing the release date of May 5, 1932, attention was called to a substantial decrease in the frequency of disability due to diseases of the skin throughout the year of 1931.

"Although this decline in the incidence of skin and other diseases is attributed only in part to the factor of personnel selection (United States Public Health Report, January 15, 1932), this factor is credited with having excluded a group containing a 'larger proportion of potential sickness than the group which remained', which is just what one hopes to do with the selective tolerance probe.

"Since 5% of all individuals are known to have a congenital defect (idiosyncrasy) of the skin which predisposes to eczema; and because of the larger percentage of individuals who, on account of their acquired state of allergy (hypersensitiveness), have a tendency to eczema, — it is my idea that the fitness of the largest organ of the body should be investigated more frequently."

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## The Management of Ocular Injuries

DR. WILLIAM C. FINNOFF *in Colorado Medicine*:—The important points in the management of ocular injuries are prompt and early treatment, surgical cleanliness and proper replacement of lacerated tissues to secure satisfactory cosmetic and functional results; gentleness of manipulation; and last but not least, prompt referring of cases to qualified specialists, when indicated.

The steadily increasing number of automobile accidents producing more frequent facial injuries necessitate that the cases be seen by physicians who have had special training so that the proper results will be obtained from the cosmetic point of view and also that the functional use of the eye and its structures be properly maintained.

In all injuries in the region of the eye, carefully elicited information should be obtained regarding the circumstances of the accident.

Lacerations of the eyelids should be thoroughly cleansed with sterile solution and a general anesthetic should be used if the pain is severe. Mild antiseptics should be applied and the margins of the wound approximated as early as possible to their normal positions. The detail of the special technique are very well given in the author's presentation.

It is also important to keep in mind that in dealing with cases of excessive lacerations of the cheek, the tissue should so be manipulated and repaired that there will be no distortion of the eyelids. The same principle should be followed in treating burns of the face in the region of the eyes, which are very commonly followed by contractions and deformities of the eyelids.

In perforating injuries of the eyeball, enucleation is sometimes indicated; however it should not be done without the advice of an ophthalmologist.

Plastic operations should never be attempted in the region of the eye whenever there is infection present, since infected wounds produce considerable deformity and if improperly treated, result in eversion of the eyelids due to the contraction of scar tissue. One point cannot be overemphasized: the necessity for doing all repair and plastic work in reference to facial deformity before any work is attempted on the eye—a successful blepharoplasty may be ruined by a subsequent operation on the face.

In the correction of injuries of long standing, several principles are to be followed: the most important is to never sacrifice tissue unnecessarily — second, one should aim for a slight overcorrection and never be contented with undercorrection — operation should never be done until all signs of infection have subsided — finally, sufficient time should be allowed for the full contraction of scar tissue to occur.

An ingenious method for restoration of the eye-socket was first proposed by Esser; this consists in obtaining a cast of the cavity by using dental modeling compounds and covering the mold with an epithelial graft with the serous surface outward, burying it into the cavity after all bleeding has subsided. This method is one of the greatest recent advances that has been made in plastic surgery in the region of the eye.

Finally, a thorough study of each case should be made on several different occasions before any operation is attempted; the technique should then be carefully planned before the operation is undertaken.

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## The Value of Medical Service to Employers and Employees

DR. H. B. SCHOENBERG *in American Mutual Magazine*: — With the passage of workmen's compensation laws the burden of the expense for injuries to workmen was placed upon the employer and it became necessary to provide medical and surgical treatment for workers injured during the course of employment; furthermore, it was also necessary to prevent injuries as far as possible.

Experience has demonstrated that preventive medical work in industry has proved of greatest importance in the earliest attention to trivial accidents and injuries, thereby reducing the amount of compensation and time lost.

It has also been shown that better working conditions produce less sickness among employees and smallest

loss of time due to accidents. The resulting benefit in the general physical and mental health of employed groups demonstrated that proper health supervision of workers pays in terms of return upon the investment, besides fulfilling broad humanitarian objectives.

The primary purpose of physical examinations in industry is to assist management in placing the worker in an occupation for which he is physically suited. Defects, both mental and physical, are also brought to light and correction is not only made possible when it will do the most good, but employment selection is thereby enhanced. The physically handicapped worker is furthermore assured fair treatment; before the institution of proper examinations and their adequate application to employment problems, the handicapped worker was many times rejected and became a charge upon the community, furnishing recruits to the ranks of dissatisfied and radical elements.

By proper placement, based upon physical qualifications as well as knowledge and training, it has been found that labor turnover is lessened, accidents are minimized, absenteeism reduced, and production and earnings increased, to say nothing of a greater feeling of contentment and satisfaction on the part of employees.

Prospective employees have many times feared that the physical examination would disclose defects and conditions preventing their pursuing a gainful occupation. However, experience has shown that the examiner keeps in mind the three reasons for rejection, namely danger to the employee, to others, or to property; it has thus been found necessary to deny employment to only a very small percentage of applicants.

The principal objectives of employment physical examinations may be mentioned as follows:

1. Facilitation of occupational condition.
2. Maintenance of higher performance standards.
3. Reduction of absenteeism and labor turnover.
4. Discovery of early signs or symptoms which might result in incapacitating disease.
5. Diagnosis of conditions making the employee prone to accidents or in causing accidents to others.
6. Prevention of the introduction of communicable diseases into industrial establishments.
7. Discovery of applicants whose employment in any way would constitute a source of danger to themselves, to their fellow workers, or to property.
8. Diminution of the costs of compensation and other insurance benefits.
9. Promotion of better industrial relations.

Although the number of industrial health services with complete and accurate cost accounting systems is relatively small, preventing the collection of financial data on a large scale, sufficient information exists to warrant the conclusion that under efficient administration, the aggregate of tangible returns from industrial health programs exceeds the operating costs by a substantial margin. It is also the consensus of industrial executives who have had considerable experience with health services that the returns which can actually be measured in terms of dollars and cents exceed the expenditures for carrying on such services.

It should be remembered that there are some returns which are intangible and to which it is impossible to assign financial equivalent; others are far too intricate and subtle to lend themselves readily to monetary calculations. Furthermore it should be recognized that returns which cannot be measured in terms of dollars and cents are at least as great and valuable as those permitting of more precise evaluation.

Diagnostic laboratory examinations made through industrial health service are considered to be worth the current local prices for such work. First aid dressings and surgical operations have a tangible value that can be estimated according to local standards, in addition to the great saving of time effected by the installation of a treatment service in the plant. Reduction of infection is likewise an important item, particularly from the point of view of preventing disability, deformity and even death. When the returns from these activities are based on services rendered and man hours saved, they may be conservatively placed at double the amount of the operating expenditures.

The medical department in industry is designed primarily for the care of the health of workers; however, employees are quite prone to estimate the attitude of management toward the medical department and are particularly impressed if the higher officials and executives themselves make use of the services available. Such a policy should cause no difficulty if management secures the most capable physician available, to direct the work.

It should be remembered that in industrial work, second rate physicians are as a great a menace, or even greater, than second rate executives of any other type. The value of a high grade physician is predicated largely upon his ability through skillful and adequate treatment to reduce workmen's compensation charges and the loss of production time due to accidents. But in addition to this, he must have a pronounced ability to understand and deal properly with human nature in groups. For these reasons, it will be ultimate economy to secure the best trained and prepared physician available.

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## Effects of Inhaled Mineral Dusts

DR. LEROY U. GARDNER *in National Safety News:* — Although the term pneumonokoniosis applies to various forms of dusted lung, such as anthracosis, siderosis, chalicosis, byssinosis and tobaccosis, only silicosis and asbestosis today are clearly identified as clinical entities, the other forms of pneumonokoniosis lacking complete definitions and correlation with pathological findings and chemical studies.

In silicosis, the essential pathological change consists of the formation of nodules of connective tissue developed first in the lymphoid areas situated in the drainage apparatus of the lungs. These fibrous nodules interfere with the removal of foreign bodies and subsequently inhaled particles accumulate in the framework of the lungs, gradually decreasing the normal elasticity of the lung tissue and encroaching upon the proper functioning elements. This is reflected clinically in shortness of breath which is a cardinal symptom and also affects the right heart because of increasing difficulty in forcing blood into the organs.

Asbestos dust because of its fibrous structure is not transported very far into the lung tissue, tending to lodge along the walls of the finer tubules and little of this dust is removed by the lymphatic drainage system. Tissue reaction therefore occurs principally in the neighborhood of the bronchioles where the solution of the asbestos fibres occur; the effect of this irritation is the overgrowth of connective tissue with the formation of a fine linear fibrosis with little or no nodule formation.

The nature of these changes probably depends upon chemical irritation, which is the generally accepted principle today. Both silica and asbestos likely dissolve in the slightly alkaline body fluids producing a silica in colloidal form, which

irritates the connective tissue cells, producing finally the overgrowth of the interstitial framework at the expense of more highly specialized anatomical structures.

The relationship of inhalation of free silica and asbestos dusts in the production of tuberculosis is a very important problem. The actual role of asbestos dust in the lighting up of tuberculous infection is not as clear cut as that of pure silica. There are numerous reports of deaths in asbestosis, due to a terminal tuberculosis, but surveys of living workers have failed to demonstrate any excess of such infection. In silicosis, however, a terminal tuberculosis may be the cause of death in perhaps 75% of the cases. Apparently the silicotic tissue offers a particularly favorable soil for the continued multiplication of tubercle bacilli; experiments have even shown that attenuated forms of tubercle bacilli will produce rapidly fatal tuberculosis in silicotic guinea pigs. Inhaled silica dust will also cause a preexistent quiescent tuberculosis to become progressive and active.

Not only do tubercle bacilli seem to develop with great rapidity in tissues previously damaged by silica, but other forms of bacteria also show this same tendency, notably the type of bacteria which cause pneumonia.

For instance, the pneumonia rate among the silicotic laborers of South Africa is many times that in nonsilicotic natives, living under similar conditions. Although case reports of fatal pneumonia in asbestosis are frequent, morbidity statistics from large asbestos workers are lacking and for other dusts the data are even more fragmentary.

Little is known of the effects of other dusts, except in a few instances. Aluminum oxide is a non-siliceous dust, the particles of which are hard and sharp as compared with crystalline silica. However, in experimental work, the reaction occurring from the injection of this type of dust as compared with silica is very slight. Carborundum is another example of a dust having hard and sharp particles, but experimentally this dust produces only a low grade inflammatory change with no nodules, after periods of four years' observation. The evidence, therefore is against the sharpness and hardness of the particle as the cause for the production of fibrosis; the chemical action as now held by most authorities, is apparently responsible for the typical changes noted.

The need for the further study of the effects of inhaled mineral dusts is emphasized; it is particularly important that such study should include an investigation of the effects of different types of dust, both in the pure state and in measured combinations, since there is relatively little or no knowledge concerning mixed dusts.

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## Tularemia—A Review of 103 Cases

DR. WALTER M. SIMPSON *in The Ohio State Medical Journal*: —In commenting on the importance of tularemia, the author states that eight years ago the disease was practically unknown in medical literature and that reports of all but 15 cases had appeared up to that time. Now, however, the disease is recognized in all but five states of the Union and descriptions have appeared in the medical literature of every civilized nation.

A review of international literature is given, commenting particularly upon the clinical and bacteriological aspects.

The most important factor in the diagnosis of tularemia is to have the disease in mind, according to the author. The history of contract with wild rabbits, followed within two or three days by the development of an indolent ulcer frequently at the site of an injury, regional adenopathy and the onset of symptoms of influenza-like character present presumptive evidence of tularemia. The most common errors in diagnosis have been to confuse the disease with a streptococcus infection, typhoid fever or undulant fever. A confirmation of the clinical diagnosis is accomplished by an agglutination test for which blood is collected in the same manner as for a Wassermann test. Another confirmatory method is to isolate the specific bacteria from guinea pigs previously inoculated with the blood of the patient.

The most important phase of treatment, according to Dr. Simpson is prophylaxis. This is done by the education of market men, hunters, and housewives, as well as others who may come in contact with wild rabbits, urging thorough cooking to destroy the infective agent, and warning individuals who handle wild rabbits to wear gloves.

It is advised that persons be strictly confined to bed during the febrile period. It is useless and often dangerous to make incisions in the primary lesion or to incise enlarged regional lymph nodes, until there is definite evidence of suppuration. There is no evidence that any of the suggested therapeutic agents of chemical character appreciably alter the course of the disease.

The author's summary and conclusions follow:

"1. During the past five years tularemia has rapidly assumed the position of an important public health problem. Its widespread prevalence in North America, together with reports of its existence in Norway, Sweden, Russia, Japan and England, indicate that the disease is probably world-wide in its distribution.

"2. Newly discovered animal hosts and insect vectors indicate the ever-widening spread of the disease and further insure its perpetuation. While the wild rabbit remains the most important source of infection for other animals and man, many new sources of human infection have been described.

"3. One hundred and three cases of tularemia have been encountered by the writer. This represents the largest number of cases to be reported from such a circumscribed area.

"4. The clinical manifestations of the disease are distinctive and are not easily confused with any other disease. The agglutination test is highly specific.

"5. A goat antitularense serum has been developed by Foshay, which gives promise of providing a reliable specific therapeutic agent against tularemia."

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## Hernia—Report of an Unusual Case

DR. W. M. JUNKIN *in The West Virginia Medical Journal*: —A coal miner, age 47, was admitted to the Davis Memorial Hospital August 1, 1932, because of a left inguinal hernia. The hernia was first noticed by the patient two years before admission. It was stated that just prior to the appearance of the hernia the patient had lifted a large lump of coal and had noticed a stinging pain in the groin at that time. The next morning he became nauseated and vomited. Upon consulting his physician the same day, he was told that he was ruptured and advised to wear a truss. This he did most of the time, but not consistently. Although the hernia came down a number of times, the patient was always able to reduce it himself. The past history and the family history were essentially negative and there was no instance of hernia in his immediate family.

Physical examination revealed a fairly well developed middle-aged white male

except for the findings in the left inguinal region which showed apparently a small left indirect inguinal hernia which was reducible. About an inch below the hernia there was a small lump approximately two inches through its longest diameter; the mass was fixed, did not transmit an impulse on coughing and was assumed to be a lipoma.

On August sixth under spinal anesthesia preceded by morphine and scopolamine, the usual skin incision was made parallel to Poupart's ligament. An indirect inguinal hernia of the acquired type was exposed, the sac being empty and about an inch and a half in diameter. Repair was made, but before closing the skin, the skin and superficial fascia were dissected to expose the "lipoma." This, however, proved to be a glistening capsule and when opened was found to be the sac of another hernia in which was densely adherent omentum. The sac was dissected free, the unhealthy portion of the omentum removed, and the hernia repaired. It was apparent that the two hernias had existed on the same side, one an indirect inguinal hernia and the other an incarcerated femoral hernia.

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## The Industrial Commission and Its Relation to the Medical Profession

DR. JOHN Z. BROWN *in Colorado Medicine*:—This article is a description of the experience of the Industrial Commission of Utah and its relation to the medical profession.

Subsequent to the enactment of the workmen's compensation law in Utah, in 1917, the schedule of fees paid physicians together with other restrictions imposed worked a decided injustice on the medical men. As a result of this, some of the most experienced medical men refused to take care of such cases and complaints of injured men were, therefore, taken to the commission. At that time the injured persons also asked to be allowed to choose their own physicians. It was the custom of the commission to employ a physician to serve as referee, and he was a political appointee.

Subsequently, after many meetings of committees from the state medical association with the Industrial Commission and insurance carriers, extending over a period of years, the present arrangement was accomplished.

This arrangement provided for an increase in fees, through which the best informed and recognized physicians would give their services; the agreement was also reached that the fee schedule would protect all parties concerned from the unscrupulous physician who who would pad his bill and that injured persons would be protected from incompetent services. Accordingly the following listings were made:

| | Old Fee Schedule | New Fee Schedule |
|---|---|---|
| Office dressing | $ 1.00 | $ 2.00 |
| House visit, day | 2.00 | 3.00 |
| House visit, night | 3.00 | 5.00 |
| Fracture forearm-one bone | 15.00 | 35.00 |
| Fracture forearm-both bones | 20.00 | 50.00 |
| Fracture femur | 30.00 | 100.00 |
| Amputation thigh | 40.00 | 100.00 |
| Laparotomy | 40.00 | 150.00 |
| Herniotomy | 45.00 | 100.00 |
| Enucleation of eyeball | 35.00 | 60.00 |

In addition to this arrangement, the Utah State Medical Association agreed to furnish a committee of three experienced physicians which meets regularly with the commission at the state capitol building every Friday morning. At these meetings the committee assists the commission in rating disabilities, adjusting fees, and also acting in an advisory capacity regarding the contentions of insurance carriers. Examinations are made of the injured person with especial attention to the history of the case, including x-ray and laboratory findings which are furnished by physicians who have already been in attendance. The problems are discussed with the original physician in each case. Representatives of the insurance carriers present their sides of the case and all parties have a chance to give their opinions and judgments. Subsequently each physician on the advisory committee presents his conclusions to the industrial commission which then makes the final decision, as provided by law.

The committee of physicians serves without remuneration and as a result their findings are not influenced by fees. This results in the use of an unbiased, scientific body rendering a competent and confidential service, without cost to the injured man, the insurance carrier, the state commission, or the state of Utah. The service rotates, each doctor being on duty six months, a new man retiring and going on every two months. Included in the rotating committee at all times is a competent x-ray specialist.

It is further provided that unusual cases are appealed to the council of the state medical association (consisting of president, president-elect and three councillors elected by the house of delegates). The five men in the council hold a special meeting with the insurance carrier, the original physician and the Commission and talk over their common problems.

The result of this arrangement has been that state officials have been highly pleased with the service to the extent that they have suggested that the physicians serving on the voluntary committee be paid for their services. The profession, however, does not wish this done because it is their opinion that the service would then degenerate into political doctors who would compete for the service.

Included in the additional work of the Utah State Medical Association is a survey of the fee schedules and the rules governing them, as obtaining in every state where such schedules exist at the present time. As a result of this survey, a great many interesting comparisons have been made and a number of important points regarding the administration of rules and regulations regarding fee schedules have been brought to light.

The persons who have had experience with this system believe, therefore, that it has resulted in a satisfactory working arrangement between the injured employee, the physician, the insurance carrier, and the industrial commission of the state of Utah.

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## Severe Infections of the Hand

DR. JOSEPH E. A. CONNELL *in Colorado Medicine:*—It can readily be understood why early diagnosis and proper treatment of major infections of the hand are so extremely important, when we appreciate that 80% of the working population earns a living with its hands.

According to Weinberg, the principal errors in dealing with such infections are: (1) lack of knowledge of the anatomy; (2) inability to anticipate the direction of spread of the infection; (3) failure to diagnose the presence of pus; (4) incising areas where no pus exists; (5) opening new avenues of infection by improper incisions; (6) incising lymphatic infections not localized; and (7) improper dressings and improper medication.

As Kanavel well says: "It is not enough to control the infection, but we must preserve the function of the hand as well." To accomplish this result one must have a clear conception of the anatomy before attempting to treat infected injuries of the hand.

The three types of severe infections of the hand are lymphangitis, tenosy-

novitis, and infections of the fascial spaces.

Lymphangitis as its name signifies is a spreading infection of the lymphatic vessels usually following a slight abrasion or puncture wound. The typical clinical picture presents a reddened, swollen, painful finger with red streak extending up the forearm and enlarged and tender epitrochlear or axillary glands. The patient may have chills and a high fever, and feel ill. Usually there is inflammation about the site ot the injury but no evidence of pus; there may be edema. No incision is indicated in this type of infection, because this would open new lymphatics and favor further absorption. The patient should be put to bed, the arm elevated and enveloped in a warm dressing and supportive measures practiced. In the majority of cases this will be sufficient, but where localized abscesses or tenosynovitis develop, it will be necessary to make proper incisions; in these cases prevention of spread of infection and rapid absorption may be accomplished by keeping the arm at rest and applying Bier's hyperemia for 12 to 18 hours.

Probably the most disabling infection of the hand is tenosynovitis, cardinal symptoms of which are flexion of the finger, exquisite pain on extension, tenderness corresponding to the outline of the sheath and swelling of the entire finger. It is especially important to understand the anatomy of the tendon sheath, from both the diagnostic and therapeutic point of view. This principle is of particular significance when considering the communication of the radial and ulnar bursae which according to Kanavel exists in about 80% of cases. The treatment of tenosynovitis is discussed with the treatment of infection of the fascial spaces.

In considering the anatomy of the fascial spaces, there are five to be named: the middle palmar space, thenar space, hypothenar space, dorsal subcutaneous space, and the dorsal subaponeurotic space. The most frequently involved are the middle palmar and thenar spaces, and in both there may be a severe systemic reaction. In an involvement of the middle palmar space, the concavity of the palm is lost, with exquisite tenderness locally, the fingers being rigidly flexed and rigidity more marked in the little finger. There is also associated swelling of the thenar space and the dorsum of the hand is swollen and edematous. In infections of the thenar space, there is a ballooning of the thenar eminence with extreme tenderness and pain; the thumb is pushed away from the hand and the distal phalanx is flexed.

In the treatment of infection of the tendon sheaths, incisions should be made at the sides of the fingers to avoid flexion creases and to avoid injuring vessels and nerves and also to prevent a herniation of the tendon. Incision for the ulnar bursa should follow the course of the tendons to the little finger, obliquely upward and radialward; the incision for the radial bursa should curve to the ulnar side of the thenar eminence to avoid the thenar muscles. In both cases incision should be made at the ulnar side of the forearm—never over the volar surface of the wrist, as the pus lies under the flexor tendons.

In treating the mid-palmar space incision is made between the middle and ring fingers, starting a little above the web and extending to the middle flexion crease of the palm; the vessels, nerves and tendons of the middle and ring fingers are then retracted to their respective sides and an artery forcep is thrust into the abscessed space and the blades opened to secure proper drainage.

Drainage of the thenar space is accomplished by an incision on the dorsum, to the radial side of the index metacarpal, opposite its middle and on a level with its flexor surface. Artery forceps are then thrust into the thenar space across the flexor tendon of the index metacarpal.

In subsequent treatment the wound should be packed lightly with vaseline gauze to stop oozing and to convert the incision into an open cavity; tubes and through drainage should not be used because of danger of pressure necrosis of the tendons and sheaths and the possibility of developing extensive fibrosis. Dressings should be done in the position of optimum function, using warm boric or saline applications, changed in 24 hours under sterile precautions. At that time the packs are removed and the edges of the wound kept open if necessary with vaseline strips. Wet dressing should be discontinued as soon as active inflammation is controlled, usually within a period of 48 hours; active motion should then be commenced.

Dr. Connell concludes that:

"1. Pus does not necessarily coincide with the maximum swelling, but the point of maximum tenderness is a better guide.

"2. The symptoms of infection may be marked and manifest or obscure and misleading. The local symptoms usually predominate, and lead one to an early diagnosis.

"3. Puncture wounds play a most important role in severe infections of the hand.

"4. The volar surface is more apt to become infected and the infection of greater danger because of its peculiar anatomy.

"5. Early diagnosis and adequate incisions are imperative to good results.

"6. General anesthesia should always be used in major infections of the hand, as local anesthesia is apt to lead to inadequate drainage, and there is the added danger of carrying the infection into a small vessel while injecting the anesthetic."

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## Insurance Rating on Occupational Diseases

EDITORIAL, *in The Insurance Field:*—In the filing of a revised rate and minimum premiums for workmen's compensation insurance made by the National Council on Compensation Insurance and directed to the attention of the insurance commissioner of Michigan, a basic manual proposal for an occupational disease program has been included.

The Council has requested on behalf of stock companies a slight increase to cover occupational diseases claims arising under Clause 1B of the standard policy, in addition to a flat rate increase of 16.9% over rates now in effect.

This program is the product of long study by various committees and will become effective in all non-regulated states December 31 for all new and renewed policies.

The schedule includes the chief diseases occurring in the course of such work as follows: silicia, asbestos, lead, chrome, exposure to anthrax, benzol, mercury, caisson work, radio-active substances, and diseases not otherwise classified.

The average increase for occupational disease claims is distributed among various classifications in accordance with the hazards found in each. The hazard rates begin with two and run to 100; flint or spar grinding and silica grinding are found in the highest bracket, with silicosis given as the occupational disease; other high weight hazards include stone-cutting and polishing with a rate of 90, red or white lead manufacturing is placed at a hazard rate of 72; dry bat-

tery manufacturing is placed in the lowest bracket rating of 2.

For classifications included in the list there is a basic occupational disease loading of $.01 per unit of hazard weight and for all other classifications $.01 has been added to the weight as heretofore determined.

This new program includes modifications to meet the various requirements of the several state compensation acts in regard to occupational diseases.

The Michigan commission has decided against graduation of rates which necessitates a new filing order to decide upon the revised rates.

It is stated that the need for increased compensation rates in Michigan is too imperative to permit withholding the introduction of new rates pending legal proceedings to test the validity of the anti-discrimination commission's decision.

There is more danger that the increase will prove insufficient than there is that it will prove to be excessive.

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## Carbon Monoxide from Paint in Sealed Compartments

I. F. DUDLEY, F. G. EDMED AND R. C. FREDERICK *in The Journal of Industrial Hygiene (January, 1933):*—The authors refer to a previous report printed in the same journal in 1931, in which experiments showed that carbon monoxide was present in the air of sealed compartments on board ship, and that the carbon monoxide was derived from the linseed oil of the paint used.

During further research as announced in the present report, the composition of various paints is considered; chemical investigations include the estimation of carbon monoxide, carbon dioxide, and oxygen in various samples of paint; biological experiments were carried out by exposing mice to the gaseous contents of containers and the analysis of the blood of the animals for carbon monoxide by means of the Hartridge Reversion Spectroscope.

The observations made lead the authors to conclude that "It is shown that any composition such as paint, containing linseed oil will in a confined space such as a sealed compartment of a ship, not only give rise to dangerous concentrations of carbon monoxide but will also, through absorption of oxygen during drying, produce an atmosphere seriously, and in some cases almost completely deficient in oxygen."


# THE BULLETIN

*of*

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THE OBJECT of this Association shall be to foster the study and discussion of the problems peculiar to the practice of industrial medicine and surgery; to develop methods adapted to the conservation of health among workers in the industries; to promote a more general understanding of the purposes and results of the medical care of employees, and to unite into one organization members of the medical profession specializing in industrial medicine and surgery for the mutual advancement in the practice of their profession.

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## ANNOUNCEMENT

THE AMERICAN Association of Industrial Physicians and Surgeons is not dead but has only suspended activities during the period of the economic depression. Now that business in general is improving, the Association is planning on resuming its activities. The new era for industry which seems to be dawning under the National Industrial Recovery Act will naturally affect us and our work, and I believe it will present an opportunity for improving our status in industry.

The Association is still strong financially and in membership. There were a few resignations — only from those members who have left this specialty of medicine. By the action of the Board of Directors in remitting the dues for 1932 and 1933 most of our members are in good standing until January 1st, 1934. There is over $1500 in the treasury.

*Industrial Medicine* is now our official Journal and a certain amount of space has been allotted to us for association news. Articles of general interest covering the various phases of industrial medicine and surgery; case histories of unusual cases, special or new methods of treatment; queries in regard to some problem you want help in solving; personal news items and in fact anything that will make our section newsy, interesting and instructive should be sent to the secretary.

The Industrial Doctor
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# ASPHYXIA

Abstracts of papers read at New York State Conference on Problems Relating to Asphyxia, New York City, May 24, 1933, under auspices of Society for the Prevention of Asphyxial Death.

## Fundamentals of Asphyxia

By Yandell Henderson, Ph.D.
*Yale University*

THE PROBLEM of asphyxia is a phase of the problem or respiration and respiration is the chief process of life itself. The relations of oxygen and carbon dioxide form one of the deepest problems of physiology. The after effects of asphyxia are among the most important problems for pathology.

One of the fundamental conditions of health is a balance between oxygen and carbon dioxide in the body. Oxygen deficiency is the initial cause and first stage of asphyxia, out of which develops the second stage of asphyxia, characterized by carbon dioxide deficiency and a compensatory decrease of the bicarbonates of the blood without loss of alkali from the body.

The therapy which nature itself indicates to combat asphyxia and related conditions is, therefore, not only the restoration of an ample supply of oxygen, but also the restoration of the normal amount of carbon dioxide. Carbon dioxide then recalls the normal amount of alkali into use, and with the return of the normal relations of oxygen, carbon dioxide, and blood alkali the chief elements in the living system, the circulation, respiration, muscle tonus and the mind, again become normal.

There is not space to deal here with the details of the technique of inhalation therapy. But it is important at least to point out that carbon dioxide may be administered according to two distinct plans. In one a mixture of a certain percentage of carbon dioxide (formerly 5%, and now generally 7%) in oxygen is used; and every patient breathes exactly this percentage regardless of his special condition and needs. In the other plan a mixture of 20% to 30% of carbon dioxide in oxygen, or even pure carbon dioxide, is used. It is administered through an open mask so that air is inhaled and mixed with it. The amount of carbon dioxide is adjusted to the special requirements of the particular patient.

The first of these methods is suitable for the use of laymen, such as the members of the rescue crews of city gas companies, and the police and fire departments. It is vitally important that the victims of carbon monoxide asphyxia shall be treated at the earliest possible moment and generally before a doctor arrives.

The second method is generally preferable in hospitals, particularly in connection with anesthesia. It is also very much cheaper. For most of the newborn babies that do not breathe spontaneously, or breathe poorly, mixtures of 7% to 10% of carbon dioxide in oxygen are sufficient. But in extreme cases higher percentages of carbon dioxide are required and should be administered by an anesthetist accustomed to using apparatus that will supply controlled percentages. In such cases and in the prevention of post-operative pulmonary complications in adults the amount of carbon dioxide should be adjusted according to the reactions of the patient. It is not enough, as some physicians, surgeons, and even clinical investigators have done, to say to a nurse. "Give the patient carbon dioxide". without further specific directions or supervision.

## Principles and Applications of Differential Pressures

By Dr. Pol. N. Coryllos
*Professor of Clinical Surgery*
*Cornell University Medical College*

THE STUDY of the different forms and devices of differential pressures allows us to formulate a number of conclusions.

1. All elaborate and cumbersome apparatus have become unnecessary and absolete. The only forms of differential pressure in use today are the mask method with positive pressure and endotracheal insufflation.

2. These methods are so closely connected to the administration of anaesthesia, that they can hardly be separated from it. This is especially true in intrathoracic surgery where the success of the operation depends in a great part upon the skill and knowledge of the anaesthetist.

3. In the group of "differential pressure procedures" belong the methods devised for resuscitation" of patients in whom respiration has failed. The life of the patient depends entirely upon the skill of the rescuer. An accurate diagnosis of the form of asphyxia will dictate the method to be used. The time at our disposal in these cases in short. It is measured by minutes and often by seconds. Immediate action adequately adapted to the case should be installed without loss of time and skillfully carried on.

4. From the above it becomes obvious that in the constantly enlarging field of gas-therapy, we need men with special training, scientific and practical, who will be able to carry on and to further develop this new branch of treatment. These men must have an extensive knowledge of the physiology and the pathologic physiology of respiration and circulation, of the physiological properties of the gas used and of the technique of administration.

It seems therefore that the men prepared for this work are the anasthetists, provided they complete their general training by the highly special-

ized physiological knowledge indicated above. The effort which is being made today, and this symposium is a proof of it, shows that we are near the point where the anaesthetist of today will develop into the gas-therapist of tomorrow, and will assume the leadership in this new branch of therapeutics.

We all believe that these men will advance and perfect the treatment which is insured today by the emergency squads and the lifesavers. Whatever may be the team training, the courage and devotion to duty of these men, they are not always sufficient to replace scientific knowledge and scientific training.

## Infant Death with Special Reference to Asphyxia

By DR. SHIRLEY W. WYNNE
*Commission of Health*
*New York City*

THERE has been some decrease in the death rate charged to the pneumonias, and to the infectious diseases. In contrast to this there has been little change in the death rate charged to what we conveniently speak of as neonatal deaths, i.e., premature birth, injury at birth and other diseases peculiar to early infancy.

Our great problem now in infant mortality is the reduction in neonatal deaths, i.e., the deaths which occur in the first few days of life. Nearly 24% of all infant deaths in New York City occurred in the first day of life; over 38% occurred during the first week, and more than half of all infant deaths occurred in the first month. It is clear that the activities ordinarily carried on by the department of health can have little or no effect on about 40% of the infant deaths.

The work of our baby health stations may, to be sure, result in a further reduction of deaths due to diarrhoeal disease, and the administrative control of the common infectious diseases of childhood may result in a decrease of the deaths now caused by these infections. Routine Wassermann tests on expectant mothers and adequate prenatal supervision should also contribute to a reduction in the infant mortality rate. From what has been said, however, it will be clear that, apart from certain "sore spots" in this city, which I shall discuss in a moment, the health department has about reached the end of its efforts to reduce infant mortality. And I do not see how the pediatricians can contribute very much more. The great loss of infant lives occurs before the pediatrician has charge of the infants.

I am much interested in the plan of the Society to reduce asphyxial deaths. In connection with the infant mortality the goal would be the 7% of the infant deaths to which I have already referred. It certainly is worth our effort to save over 400 lives a year if this prospect appears at all likely.

I feel strongly that the organized medical profession should face the facts brought out in this analysis and take steps to reduce what I consider to be still a considerable proportion of preventable deaths. Is the large number of deaths charged to injury at birth the result of too much operative interference with the normal course of labor? Does the high mortality charged to premature birth indicate insufficient prenatal care? Could not a considerable proportion of the deaths charged to atelectasis and asphyxia neonatorium be prevented by proper treatment?

These and other questions which a study of the causes of death during and immediately following childbirth would suggest, deserve careful attention, expecially by obstetricians. The problem of preventing deaths from atelectasis, asphyxia, neonatorium and aspiration pneumonia might well be studied by your newly organized society. The department of health welcomes every effect which holds out the promise of reducing our mortality rates.

It has been suggested that the geographic location of areas in the city with excessive infant mortality rates would be of service with a possible view of locating a future ambulance service.

Tabulations are available for the entire city and will gladly be placed at the disposal of your society. It may be that your first efforts to reduce infant deaths caused by asphyxia should begin in these "sore spots".

# Central States Society of Industrial Medicine and Surgery

Official Proceedings

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## Traumatic Chest Diseases

By HERMON HARRISON COLE
*Springfield, Illinois*

IN WRITING a paper to be delivered to a group of industrial surgeons I assume that they are interested in traumatic surgery which only occasionally involves the chest. I seriously doubt whether an attempt to go too much into details of the management of a specific chest injury would be of particular interest to them. Their primary object, as I see it, is the immediate saving of life and prevention of serious sequelae which so often follow accidents of this character, not being primarily interested in the specialty of thoracic surgery. I shall confine myself, therefore, to accidental chest injuries which may occur in any man's practice, and shall attempt a statement of a few of the general principals involved in the management of these injuries which have proved, sometimes by bitter experience, to be most conservative and most conducive to recoveries. In this I make no claim to originality in the statement of these principles which are so well known to most of us who are interested especially in the chest. Many of them are of unknown origin, and have been arrived at by chest men generally as a result of experience and a comparison of notes on patients who have not done well in the past. Prior to the war, these principles were little known, and to only few men. We owe a large debt to the impetus gained in the influenza epidemic and thoracic war wounds and to large collections of chest injuries at one time and in one place. To men who already had some thoracic medical and surgical experience the principles of management were brought forcefully to mind. It was realized that the profession in general was woefully ignorant concerning intra-thoracic physiology and

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that the thoracic accident field was in almost as bad a condition. Largely due to the impetus given the subject in this manner there has been a particularly voluminous literature during the past decade and the driving home of certain basic facts in management which applies to this field and to no other. The average man in general surgical practice does not meet these conditions frequently enough to warrant the necessary time and effort to dig out the facts of the literature which he must need, to handle such cases intelligently. If I can succeed in putting down in concrete form only a few of these for immediate use I shall have accomplished my purpose.

The simplest division of this field which may be made is that into such injuries as result in hidden pathology, (internal) and those which are open to the surface and visible to the naked eye, (external). The chief danger in these patients is that the former may not be recognized and treated until so late that life is seriously endangered. Diagnosis must, therefore, be a part of this paper. In quite a percentage of so-called shock following injuries, particularly where there has been fracture of the upper three ribs or the tenth, there is found complicating internal lung pathology which, if not recognized and treated early, is almost certain to throw the balance against the patient. The two main conditions of this character are traumatic pneumothorax and pulmonary atelectasis. Neither need show any external signs of injury although both may occur in the presence of open wounds.

Pneumothorax of the traumatic type, according to most observers, never occurs in the lungs which were previously normal, the previously existing disease may not be diagnosable from history or physicial signs. Probably the most frequent method of its production is by the ripping of an adhesion at the site of a previous pleuritis although it is not always possible to demonstrate evidence that such was the case. It is perfectly true that the chest can withstand tremendous trauma without the rupture of normal lung tissue, principally because lung tissue is very elastic and exceedingly tough. With a fresh lung taken from the body, few men have sufficient strength in their hands to tear the organ apart. Recent pneumonias, or acute infections, with oftentimes recognized small areas of adherent pleura, certainly can produce weakness of structure or the fixation necessary before a lung can be torn. Its most frequent cause, however, is a localized healed tuberculous infection with an over-lying pleural adhesion which under ordinary conditions would be, and would have remained, of mere historical interest were it not for the trauma. Emphysema with its consequent thinning of the septa between air cells and the occasional formation of large bullae just beneath the surface of the lung is another predisposing cause and especially where there have been small pleural adhesions. The trauma which would produce a rupture does not necessarily have to be great under such circumstances. There are innumerable instances on record in which lungs of this character rupture spontaneously without any known trauma, and a spontaneous pneumothorax of this type is not so infrequent a cause of sudden death as might be supposed. I have seen such a rupture follow a fall of three or four feet from a step-ladder in the home, and a scuffle between young men in which no blow was struck. One instance which I recall occurred from slipping and falling on the ice. Another resulted from a fall off a sled, and I have seen at least two which occurred following whooping cough; one, which very nearly became fatal occurred as a result of an automobile accident in which the man was thrown to the pavement and not even bruised, but was brought in on account of severe dyspnoea. The diagnosis is made, first, on account of limited motion on the side affected, absence of breath sounds with good resonance, displacement of heart and mediastinum away from the pathology, and the signs of respiratory distress. An a rule there is some attendant pain which may be localized on the affected side, but may occasionally be referred to the abdomen which constitutes a rather puzzling type for diagnosis. There may, or may not be bleeding from the mouth, dependent on the extent of pulmonary injury. This symptom has been a rare occurrence in my experience. X-ray findings are characteristic and show a variable amount of collapse of the lung with displacement of mediastinal contents as noted above. The immediate dangers are: interference with normal filling of the heart and great vessels of the mediastinum, cardiac tamponade, internal hemorrhage, particularly into the pleura, and the formation of a valve flap on the surface of the lung which allows air to enter the pleura but does not allow it to escape, (valvular pneumothorax). In addition to those previously mentioned, infection of the pleural space by way of the torn lung and formation of empyema are likely to occur later. The treatment of the condition depends a good deal on circumstances found at the time of examination. In most instances the chest should be tightly strapped with the patient in Fowler's position in addition to supportive measures for circulation and treatment of general shock in which the majority of these patients are found. In the presence of increasing dyspnoea or marked cyanosis we have a definite indication to needle the chest and relax the intrathoracic pressure by the extraction of air from the chest. This must be done repeatedly in case the signs of increasing intrathoracic pressure return. Since this complication, (valvular pneumothorax), is the chief cause of death in injuries of this character it should be watched for and calls for emergency treatment. I have pumped air out of the pleura as high as eight and 10 times on several occasions for the relief of pressure and more than once have resorted to continous negative pressure apparatus in order to keep the patient from strangling himself. Under no circumstances is the pleura to be opened if it can be avoided. Repeated aspiration is far safer than open drainage principally on account of the danger of infection. It is well to leave sufficient pressure within the thorax so that the lung does not re-expand for several days. By this means the surgeon will promote healing of the lung rent by complete rest and apposition of the torn parts. This particular complication, (traumatic pneumothorax) is the cause of most fatalities associated with chest injuries. Where there has been extensive hemorrhage from widely torn tissue it is almost sure to go in the direction of the pleura not only because it is the line of least resistance, but because of the suction. Provided there has not been a valvular flap formation it is best not to touch hemorrhagic effusions for several days as the fluid itself aids not only in putting the lung at rest but may aid sometimes in closing the lung rent as the fluid rises above the hole. The fluid level, however, should be controlled by repeated aspiration. Time should be allowed for supportive treatment and to enable the patient's general condition to improve before open operation is considered. If it is done, however, one should be prepared to suture the lung and immediately afterwards a complete

re-expansion should be attempted by means of differential pressure or a suction bottle in order to localize the empyema which will follow. A good rule to follow in these case generally is to intefere only when one's hand is forced. The majority of these lung rents will heal by themselves and fortunately infection is not common unless the lung rent is extensive. Re-expansion will begin by absorption of the contained air as soon as the lung surface is again in tact.

Some years ago we heard considerable of post-operative pneumonias and traumatic pneumonia. While these things naturally occurred and still do, we now know that a fair percentage of these cases are due to a condition which we have named massive pulmonary atelectasis. Comparatively recent work has shown that mucus plugs in the large branchi are the principal cause of this condition but that it is necessary in addition to have some interference of the collateral air circulation which is known to exist in human lungs. This collateral circulation is analogous to the anastomosis between the blood vessels and consists in openings between air cells which were formerly unrecognized. (See Van Allen & Jung, Post-operative Atelectasis and Collateral Respiration, *Journal Thoracic Surgery*. October, 1931). From a practical standpoint injuries which interfere with the action of the diaphragm, whether they be above or below, and injuries to the upper ribs on either side are thought to be strongly contributing factors. The use of large doses of morphine for the relief of pain, so commonly used in extensive bodily injuries, together with the lack of general body movement are also contributing factors. The condition can be largely prevented in extensive general accidents by the use of as little morphine as is possible and by frequent moving of the patient from side to side where the condition is known or suspected to exist, or the use of ammonia or carbon dioxide inhalations to promote coughing which clears the bronchial tubes of mucus and allows free passage of air and the use of the lungs. Points in the diagnosis are lack of motion on the side affected, slight cough, greatly reduced breath sounds on the affected side, moderate percussion dullness and displacement of the heart and mediastinum toward the pathology. The condition is usually mistaken for traumatic pneumothorax or post-operative pneumonia in as much as there is dullness on the side affected, cough, low grade fever and low grade leucocytosis. The x-ray, however, will usually show marked lack of lung detail often with a lobar distribution of pathology and displacement of the heart toward it. Pneumonia does not displace the heart either toward or away from the pathology. The treatment consists in the promotion of cough, frequent moving of the patient, the use of ammonia or carbon dioxide and oxygen two or three times a day, and reduction ot sedatives. The condition in and of itself is not very dangerous unless bilateral but if let alone is particularly likely to lead to a low grade bronchopneumonia with all its attending dangers. It should be watched for in all extensive injuries of the general body as well as those involving the chest. Prompt treatment will usually clear it up in a relatively short time. I have seen this condition clear in 72 hours on several occasions, provided it was not existent too long. The ideal method of treatment is of course bronchoscopic, but bronchoscopes are relatively rare and not many towns boast one among the medical personnel. If one recognizes the condition early it can be handled by any general man and need not cause great anxiety.

Whether there is any evidence to show that heart disease is ever traumatic without an actual penetrating wound of the chest is still to some extent debative. I recently made a search of the literature of a large number of leading cardiologists of the world, including British, American, one South American and one French. While all of them mentioned the possibility of closed cardiac trauma, I have succeeded in finding only four definitely recognized cases; personally, I have never seen a cardiac injury which I believe was due directly to trauma and and nothing else unless the heart or chest wall had been penetrated. We have no findings in the heart which compare for instance with either of the preceding two lung complications. It is perfectly possible that a diseased heart may fail after an accident, as a result of shock, and it is possible, I should think, that thrombosis of cardiac vessel or rupture of a heart might be the result of trauma but such instances must be exceedingly rare. Of the undoubted cases which I have been able to find three were due to rupture of the heart valve as a result of severe strain in lifting and in one of these patients, previous heart findings led the reporter to believe that there may have been unrecognized disease of the heart present before the accident occurred. While there are a number of other intrathoracic conditions which may occur as a result of trauma without direct local injury of the chest, these are relatively rare and of no great importance to the general man. There is only one other complication which I feel deserves comment in a paper of this sort and that is traumatic pulmonary hemorrhage. I have repeatedly stated my belief that a pulmonary hemorrhage never occurs in a normal lung and I repeat that statement at this time. That it may occur in lungs not the seat of active disease at the time, but in which there has been a certain amount of extra scar tissue which fixes some portion of the pulmonary tissue making it inelastic and therefore subject to traumatic injury, is certain. I feel that there is no room for doubt that most of those internal lung injuries occur at the site of old tuberculous foci particularly tuberculosis of the bronchial glands in and about the hilus and in and about the site ot old tuberculous cavities. Occasionally the scar of an old empyema or lung abscess or even a foreign body may be the seat of serious and sometimes fatal bleeding after trauma. If one will listen to the history of pulmonary hemorrhages which occur in people who are at work at the time, he cannot but feel that in a patient so predisposed the accident occurs more often from lifting with the glottos closed or from such things as carrying heavy loads. Those who come to autopsy usually show that a preexisting scar containing a blood vessel has been torn across. Since there has been in most instances a considerable amount of perivascular sclerosis these hemorrhages are liable to be extensive and serious. If seen reasonably early the treatment of choice is the artificial production of pneumothorax. It is the best method which we have at our command and, in fact, the only therapeutic measure which gets at the seat of the trouble. Most of the acute pulmonary hemorrhage which I have operated by the use of pneumothorax have been of this character. Where the hemorrhages are seen late and there is already extensive infiltration of blood throughout the involved lung it will usually be found that the patient is safest if handled like an ordinary case of bronchopneumonia, which is, in truth, present and is the condition which causes death far more frequently than the loss of blood. Just as in other fields of surgery the line between operation and conservative medical treatment is not sharply drawn and many times factors outside the chest

will determine the course to pursue. I merely wish to call the surgeon's attention to the fact that if, in his judgment, the patient can stand a pneumothorax that it is probably better to do it. I have more often regretted by denial, than I have the more radical procedure. If the lung is held at complete rest for a period of two or three weeks and then allowed to reexpand, hemorrhages are not often repeated and complete healing will take place before complete reexpansion has occurred. The flooding of the lung in cases of this sort must be considered as a strong predisposing cause of development of activity of any latent tuberculous focus present and the patient should be assiduously watched for some weeks or months with this idea in view.

Open accidents involving the pleura, lungs, pericardium, heart or mediastinal contents are classed both in the lay mind and in the mind of the profession as among our most serious conditions. The dangers of open pneumothorax with its associated marked disturbances of mediastinal balance and the attending circulatory disturbances lead to a relatively high mortality and to serious consequences from infection. The war taught us that small penetrating wounds of the chest, bullets, stab wounds, small pieces of shell and similar foreign bodies, provided the large vessels were not directly struck, were tolerated remarkably well. Most of us have seen rifle bullets pass clear through the chest from front to back with no hemorrhage from the mouth and only small attendant pneumothorax which produces little disturbance, and have seen patients up an about in excellent condition 10 days later. Even infection, which all of us dread so much in penetrating foreign bodies, is not nearly so common as one might be lead to suppose. In the absence of valvular thorax or too severe hemorrhage these wounds are probably best dressed externally and let alone. Subsequent aspiration of blood from the pleural space will oftentimes be necessary, but unless infection has set in open operation is inadvisable. A foreign body of metallic character in the lung is rather well tolerated and difficult to reach and should be studied for considerable length of time and the evidence weighed very carefully before attempting to remove it. Those near the lung surface should be removed if possible. Those down in the hilus or deep in lung substance usually should be let alone unless they become infected. On the other hand a foreign body in the pleura should always be removed whether metallic or otherwise and regardless of location. Non-metallic foreign bodies must always be removed no matter where. The chief danger in penetrating wounds of the chest, whether from fractured rib or penetrating projectile from without, lies in the production of the valvular pneumothorax we have discussed before and calls for the same treatment. Hemorrhage, we have also discussed. An open pneumothorax is a different matter. No wound of the chest regardless of its extent should be allowed to suck air where it is humanly possible to prevent it. These wounds should be closed at once. Where there has been too extensive a loss of tissue for active apposition of the parts, the chest may be sealed with rubber dam or other suitable material. The only way that a mediastinum can reestablish a balance within the chest and the circulation can be maintained is for it to operate under a more or less fixed intrathoracic pressure and most deaths which occur from intrathoracic injuries occur from circulatory failure. These injuries are of such variety of type and due to such variety of causes that it is difficult to set forth any fixed rules of procedure. The general ones already laid down and those usual in the empyemas, to follow, however, will save a good many lives which would otherwise be lost. The chief one of these depends on the fact that the general pleura will rarely sterilize itself or can be sterilized mechanically unless the parietal and visceral pleura are in confact with each other. To put it another way; the simplest method that can be used to fill space is by lung tissue which normally belongs there. It is surprising the extent to which even a part of a lung can be reexpanded to take up space. I have seen the entire lower lobe of the lung removed and the upper lobe expanded to fill the space with only a moderate elevation of the diaphragm. It is not at all necessary that the diaphragm be attached to the tenth rib. It can be raised and attached to eight or nine on occasion, and is far better procedure usually than the collapse of external chest wall to fill the defect by some form of extra pleural thoracoplasty and there are cases here and there which distinctly benefit by elevation of the diaphragm and its paralysis by means of removal of the phrenic nerve on the affected side. The last should be considered whereever the loss of lung tissue is extensive. The abdomen can use the extra space taken away from the chest with little or no disturbance and the integrity of the limiting membrane between the two must be maintained.

Intrathoracic injuries, if at all serious, tax the ingenuity of the surgeon to the utmost and in their proper handling will sometimes call for knowledge of artificial pneumothorax, the various forms of bottles drainage, something of plastic surgery and a knowledge of intrathoracic dynamics in addition to the ordinary application of general surgical principles. This is usually too tough a proposition for a surgeon not used to these things to tackle by himself and it is well to associate himself with some internist whose business it is to know these things and for the two to work together. Just as in major general surgery, occasions arise where four hands and two brains are necessary and teamwork is essential. In general the indications of an open accidental wound of the chest are (1) treat shock, (2) combat pneumothorax, (3) reexpand the lung, (4) control hemorrhage and (5) treat infection. The handling of the first three will, to a very large extent, determine how much of the fourth and fifth will have to be done.

There was a time when traumatic injuries to the heart were considered to be uniformly fatal. One of the most brilliant chapters of surgery has been in this field in the last few years, and there are a large number of records at hand in which penetrating wounds of the heart have been successfully sutured and the patients have made recoveries and lived for considerable periods thereafter. One of the great contributions to surgery which has come out of this field is the fact that the heart can withstand a considerable amount of direct injury, and that the principal cause of death is due to the blood which has poured into the pericardium, squeezing the heart as in a vise and actually shutting off all further supply by the pressure. This condition is known as cardiac tamponade. While most of us may never be fortunate enough to have the opportunity to operate on a penetrating wound of the heart, it is nevertheless true that the technique of its approach and method of suture should be known to all surgeons. If the need ever arises it will come without warning and must be done at once. While the mortality is high there is always the possibility that life may be gained. If he has taken the trouble to inform

himself, the surgeon has everything to gain and nothing whatever to lose. Two cases were reported recently by Elkin and Phillips, *(Journal of Thoracic Surgery, December, 1931)*, and they have shown that there have been over 300 attempts at such surgery with a mortality of 48% with marked improvement in the death rate. To any one interested in this. I recommend this article. In conclusion I should like to state that it is only the exceptional case of thoracic injury which can and does have access to anyone specializing in this field and that the majority of these cases are taken care of and will continue to be taken care of by men situated as most of this group are. If success is to be had the basic principle which I have alluded to should be known. Experience in these conditions diffuses slowly throughout the profession, but there has been steady improvement in mortality. There is no reason why the next 10 years will not see the surgeon *approach the chest* armed with the confidence born of knowledge and experience which is the just due of the patient who comes for aid. I sincerely hope that this discussion of only a few of more important conditions may contribute in some small degree toward that end.

**Discussion**

DR. F. P. HAMMOND, Chicago: Dr. Cole is to be complimented on the presentation of his paper on chest injuries. He has been explicit in recommending methods of diagnosis and treatment of the three varieties of pneumothorax: internal, closed and the open types.

I want to comment on and emphasize a few points in relation to open pneumothorax, the commonest type the


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# ANTIPHLOGISTINE

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industrial surgeon has to deal with. We are living in an age of rapid transit, hurried industry and numerous mechanical devices, all of which, when something goes wrong, may cause a severe injury to the chest, with or without rib fracture, but with a penetrating wound extending to and communicating with the pleura. It should be obvious that in such an injury to avoid air being sucked into the pleural cavity is the paramount issue.

What happens when an open pneumothorax occurs rather suddenly? There will be marked dyspnoea because the lung on the side of the injury has collapsed causing the lack of oxygen, again there will be cyanosis. Pronounced inspiratory and expiratory efforts will be noted. The patient will be in moderate or severe shock due to oscillation of the mediastinum and sucking or hissing sounds during respiratory efforts. This latter condition should have been mentioned first because in the discussion of treatment the very first procedure when a surgeon is called to a chest injury is to make a close inspection for these sounds determining without delay if air is being sucked into the pleura. In such a case the very first thing that should be done is to close the wound temporarily and this should be done before the patient is moved from his position or transported. Early closure may prevent pronounced pneumothorax, shock and death.

What happens when an external wound suddenly communicates with the pleura? The lung on the affected side collapses and the lung on the opposite side is lessened in capacity because the elastic mediastinum offers little resistance. In large pleural cavity wounds with little inspiratory effort on the part of the patient both lungs would collapse to almost their limit, which would result in shock and death, but nature avoids this lethal lung stasis by causing reaction of forced inspiratory effort. The diaphragm descends, the chest wall expands, the intrathoracic cavity increases in size and sufficient oxygen is obtained to keep the patient alive. Normally the chest wall expands by air being drawn through the trachea but when an open wound exists air is sucked through the artificial opening, causing a false expansion. Reiterating, forced inspiration helps to overcome this false expansion.

The amount of air reaching the lung for aeration is inversely proportional to the amount drawn through the wound into the pleura. Now, forced expiration causes the air to be ejected from the uninjured side forcing the mediastinum toward the injured side and in turn forcing air from the pleural cavity out through the wound.

The treatment should be obvious: immediately prevent more air from getting into the pleura. As soon as facilities are available arrange an apparatus that will allow the air to escape during inspiration and no intake during expiration. One method is to plaster over the wound a piece of rubber dam sufficient in size that during expiration it will be sucked against the wound, preventing intake. Another method is to insert a rubber tube into the pleura fixing it firmly to the chest wall. This tube should be several feet long, its lower end several feet below the wound and extending into a bottle of sterile water or a mild antiseptic solution. With this latter apparatus each time the patient inspires air will be forced out through the tube into the bottle. During each expiration the solution will be drawn a foot or two into the tube, preventing the intake of air.

It is perhaps unnecessary to mention general supportive treatment.

Again I want to compliment Dr. Cole on his presentation and state that we should be just as efficient and painstaking in treating chest injuries as most of us are in abdominal injuries, even to the performing of an exploratory operation.

DR. W. J. JOHN, LaCrosse: I should like to ask Dr. Cole why it is that so frequently you find fractures of the ribs with extensive emphysema and very little or any collapse in the lung.

DR. E. J. BALL, Nekoosa, Wis.: I should like to cite a case in which we had a collapse of the lung with pneumothorax as well as rupture. There was a hemorrhage in the abdomen, and it was a complicating affair. Whether to go in and pack the liver is something which takes a better head than mine to decide. Sometimes where you have a contusion on the right side you have complicating hemorrhage from the liver as well as the closed pneumothorax.

DR. HERMAN H. COLE, Springfield (closing the discussion): To the only question that has been asked, I will have to answer that I do not know. I do not see how you can get emphysema without lung injury. I have never seen emphysema of a chest wall without complicating lung injury or open wound on the surface. They may occur but I have not seen them. In the case mentioned, I think there must have been a puncture of the lung.

# Industrial Medicine News

## A. M. A. Meeting on Silicosis

THE SECTION on Preventive and Industrial Medicine and Public Health of the American Medical Association, held a Symposium on Silicosis at the annual meeting of the Association, Wednesday, June 14th, in Milwaukee.

Dr. A. J. Lanza, of New York, presented a paper on "The Etiology of Silicosis." Silicosis is defined as a fibrotic disease of the lungs due to breathing air containing silica. The rapidity of development of silicosis depends on the amount of silica inhaled. Distinguishing characteristic of the disease is tendency to infection, particularly with tubercle bacillus. Such infection gives a uniformly bad prognosis. Silicosis is widespread and, as a cause of death, the most serious occupational disease. Previous illness or infection does not seem to influence silicosis to an important extent, aside from pulmonary infections and possibly syphilis. The disease tends to progress even after the patient is removed from further exposure to silica-containing dust.

Discussion was opened by Dr. Emery R. Hayhurst, of Columbus, Ohio.

Dr. R. R. Sayers, of Washington, D.C., then presented the subject "The Clinical Manifestations of Silicosis." This paper discussed the clinical findings of silicosis, its various stages, and silicosis plus tuberculosis, and was based on the data obtained during the first two years of operation of the Bureau of Mines cooperative clinic at Picher, Okla. During the first year, 7,722 men were examined, and during the second year 8,853. Between 20 and 25% of these had silicosis plus tuberculosis.

Discussion was opened by Dr. Benjamin Goldberg, of Chicago.

Dr. Henry K. Pancoast, of Philadelphia then discussed "The Roentgenologic Aspect of Pneumonoconiosis and Its Differential Diagnosis." In view of

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more recent pathologic and histologic studies and clinical experience, pneumonoconiosis and silicosis cannot be defined in any simple terms. There is at present a definite tendency, long ago prognosticated and now fully realized, for the condition to become an extensive medicolegal problem. This necessitates a thorough understanding of the condition from every aspect. Roentgenologic examinations are recognized as the important means of clinical study. The appearances may be simulated by or confused with many conditions, and differential diagnosis is most important when disability is claimed. Primary bronchogenic carcinoma is arousing much interest as a possible associated disease, and this aspect is fully discussed. Tuberculosis is to be discussed in another presentation.

Discussion was opened by Dr. E. P. Pendergrass, of Philadelphia.

Dr. Leroy U. Gardner, Saranac Lake, N. Y., presented the paper on "The Pathologic Reaction in Various Pneumonoconioses". Present knowledge allows a classification of the reaction to inhaled dusts in three categories: nodular, linear perilymphatic and diffuse parenchymatous. Nodular reaction is characteristic of silica; parenchymatous is produced by asbestos and possibly other silicates, and linear perilymphatic by soft coal and other dusts thus far studied. When mixtures are involved the typical reaction is modified. The type of anatomic lesion is determined by the physicochemical properties of the dust, by its effect on the motility of the phagocytes and by the degree to which the lymphatic system participates. These three types of reaction can be correlated with roentgenographic observations in the living subject. Silicosis definitely predisposes to tuberculosis; experimentally carborundum has shown a similar action; other dusts, including the silicates, have less or no effect on this infection. Disucssion was opened by Dr. Richard H. Jaffe, of Chicago.

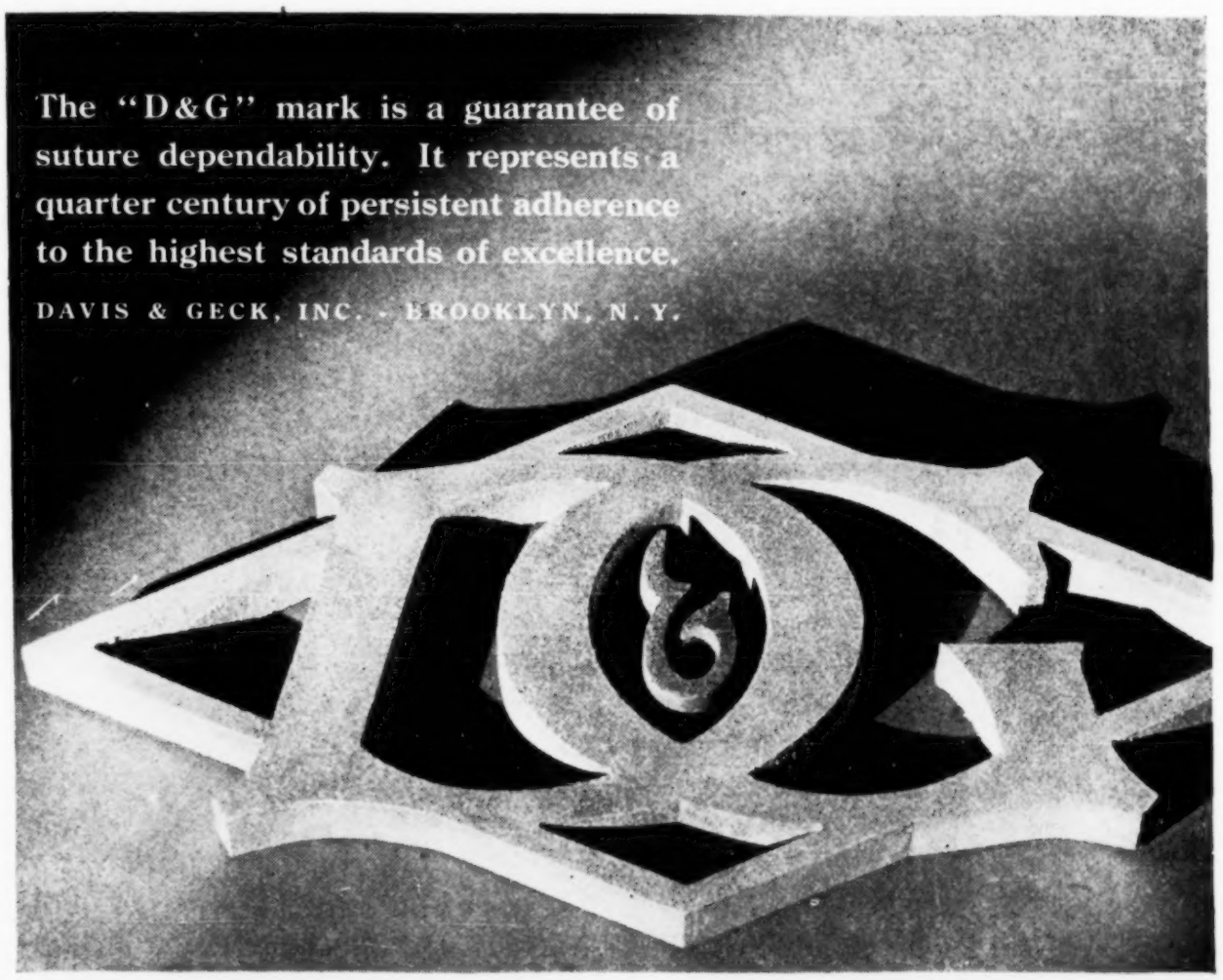
The final paper in this symposium was given by Dr. William D. McNally, of Chicago, on the subject "The Silicon Dioxide Content of Lungs in Health and in Disease". The silicon dioxide content of normal lungs varies from 0.4 to 2.2 mg. per gram of dried tissue. The lungs of tuberculous subjects contain somewhat more of silicon dioxide than normal. Some of this may come from inhalation or directly from the blood stream, as the blood of tuberculous patients contains more silicon dioxide than that of normal individuals. In every suspected case of silicosis that comes to autopsy, the lungs should be submitted to a chemical examination for the quantitative determination of the silicon dioxide present.

Discussion was opened by Dr. C. O. Sappington, of Chicago.

## The Twenty-Ninth Annual Congress on Medical Education and Licensure

THIS annual congress was held under the auspices of the Council on Medical Education and Hospitals of the American Medical Association at the Palmer House, Chicago, February 13 and 14, 1933.

Two sessions were of particular interest, one occurring Monday afternoon, February 13, on the general subject "Recognition of Specialists"; the other held on Tuesday afternoon, February 14, related especially to the training of laboratory technicians, the need of professionalization in public health, the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teaching of physical therapy, and the work of the Council on Physical Therapy of the American Medical Association.

In the session on "Recognition of Specialists," Dr. Sanford R. Gifford of Chicago gave a paper on "The Function of Special Boards of Examiners." Particular reference was made to the American Board of Ophthalmology, and the American Board of Obstetrics and Gynecology, and the American Board of Otolaryngology. The combined group has qualified approximately 6,000 specialists up to the present time. The American Board of Obstetrics and Gynecology has certified about 400 specialists in three years. The board for certifying dermatologists is planning to hold its first examination in 1933. In addition to the activities of these boards, various special societies and organizations have definite qualifications for entrance to membership. Approximately one-third of the otolaryngologists and ophthalmologists have been certified, but it is a question as to whether the people are really interested in recognizing certification. There is a certain glamour attached to a few months of European study which apparently in many instances has outshone the value of real certification and undoubted ability. There should be some ethical way to inform the public as to the qualifications of a properly prepared and highly trained man. The suggestion was made that the American College of Surgeons could require certification of specialists on hospital staffs where the College has previously accredited the hospital; the same principle should be applied to staffs of medical school hospitals. It is stated that the Northwestern Medical School will put this principle into effect in two years applying to all the teaching staff above the rank of instructor.

Dr. Walter L. Bierring presented a paper on the "Function of the States." In regard to the recognition of specialists, most state activities have been precautionary rather than determinative. Going back to early times, medical societies first handled the problems of licensure and later the regulation of the practice of medicine was accomplished through legislation. For a time a diploma was accepted without an examination, as evidence of ability to practice. In 1880 examinations were begun by State Boards and still later, only graduates of approved schools were admitted for examination. Further developed activities include the supervision of proper instruction in medical schools, and the qualifications of candidates for practice which has largely been accomplished through the work of the National Board of Examiners. The author felt that the qualifications of specialists should be rated on a national scale and not delegated to the various states. A great responsibility surely rests upon the educational forces. At the present time four national boards are functioning and attempting to do the proper type of work in recognizing specialists in their respective fields. Finally, any plan for the recognition of specialists by the various states should include the following provisions: (1) a national examining board in the various specialties; (2) coordination of activities with the National Board of Medical Examiners; and (3) the use of the Council on Medical Education and Licensure of the American Medical Association as a coordinative and supervisory body.

Dr. Irving S. Cutter, Dean of the Northwestern Medical School, Chicago, presented the subject "The Function of Medical Schools." Previous activities of specialization in the olden days centered around preceptorships and apprenticeships. Gradually the increasing demand for European study and the large number of physicians who secured this special experience also aided in the building up of specialization. The Mayo Foundation in connection with the University of Minnesota Graduate School is cited as an example of a well-planned activity which has been capable of affording excellent postgraduate training for medical men. Another example of the way in which medical schools have contributed to specialization is the interne-residency plan which has provided a very definite means of specialized training. About 15 to 40% of students in the medical schools take more than one year of interneship, thus paving the way for specialization. The saturation point in the specialties will soon be reached; possibly two-year interneships adopted generally will obviate the saturation difficulty. There is great need for the setting up of standards for the various specialties and also for informing the public of this selective ability. The American College of Surgeons has been foremost in the doing of constructive work regarding surgery and the surgical specialties. A great deal more must be done by means of residencies and fellowships in connection with medical schools and teaching hospitals.

Dr. Ray Lyman Wilbur of Washington, D.C., Chairman of the Council on Medical Education and Hospitals of the American Medical Association, gave a paper on "The Relation of the Council on Medical Education and Hospitals to the Special Practice of Medicine." The development of specialties is the inevitable result of progress in medicine. However, without control, it is natural that certain abuses would exist in the practice of the specialties, similar to the abuses which existed years ago in the general practice of medicine. The Council on Medical Education and Hospitals of the A.M.A. has been a great force in supplying what regulatory measures we now possess. It is reasonable that we should set up standards applying only to new men and applicable with some modifications to those whose names appear in the public lists of various groups. A rational plan should provide that the Council on Medical Education and Hospitals of the A.M.A. could (1) establish minimum standards for a listing of the various specialties; (2) list schools approved for postgraduate training; (3) list hospitals approved for graduate training; (4) decide what reasonable provisions can be made for those who are already practicing the various specialties; and (5) work in cooperation with the American Association of Medical Colleges, the American Hospital Association, and other groups for which arrangements would have to be consummated. It is apparent that the Council already has the machinery available to it and to American physicians for prosecuting successfully a project of this kind.

In opening the discussion, Dr. Louis B. Wilson of Rochester, Minn. stated that one of the problems about which we should be most concerned is that of the young general practitioner who refers patients to a specialist; when this is done the general practitioner should base his confidence in the specialist on competency, honesty, and hospital connections. It was stated that the American Medical Association directory does not give data which are really extensive enough in regard to information on the specialties; additional information should be collected regarding specialists. Although the American Medical Association is in the best position to collect and publish such data regarding specialists, it should not be expected that it would do this piece of work without aid in the qualifying of specialists and collecting the data. National qualifying boards should be set up by the special groups themselves who know best who are especially qualified—no ex-

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aminations should be given but qualifications should be made; a special list could then be sanctioned by the Council and published by the A.M.A. There should also be special reports by the National Board of Medical Examiners.

On Tuesday afternoon, February 14, 1933, a special session contained papers relating to the training of laboratory technicians, the professionalization of public health, the teaching of physical therapy and the work of the Council on Physical Therapy of the American Medical Association.

Dr. Walter M. Simpson, President of the American Society of Clinical Pathologists, Dayton, Ohio, gave a paper on "Training of Laboratory Technicians." The importance of the laboratory worker in diagnosis and therapy is now generally recognized. There is a great responsibility resting on the thoroughness and scientific accuracy of this type of work, because in a great many instances decisions are made as to proper type of medical or surgical treatment which is to be instituted in the future. The speaker referred to an editorial in the "Journal of the American Medical Association" noting the high standards which clinical pathology has attained. The American Society of Clinical Pathology was organized approximately ten years ago and has been greatly instrumental in building up these high standards, as well as adopting standards for the directorships of clinical laboratories. Registration was established six years ago for the purpose of listing laboratory technicians and also for the purpose of establishing relations with medical school clinical laboratories. Strict supervision has been maintained through the Board of Registration of the American Society of Clinical Pathologists and up to the present time about 1300 qualified laboratory technicians have been listed; the work has been recognized by official medical bodies as being a very necessary medium of information and control. Hospital administrators should more frequently insist upon the registration of technicians used in hospital laboratories. Placement bureaus should also be maintained in the attempt to see that properly trained and registered technicians are located to advantage. Great difficulty has been encountered because commercial schools have given makeshift courses, thus lowering the standards. Medical journals should accept only advertisements of laboratories and training schools qualified by the American Society of Clinical Pathologists. The Society of Clinical Pathologists. The Council on Medical Education and Hospitals of the A.M.A. has surveyed laboratories since 1924. Experience has definitely shown that personnel transcends laboratory material and that no matter how much opportunity there is for seeing material, the quality of the personnel is the determining factor regarding the real ability to train technicians in the various laboratories. It is important to limit laboratory training therefore, only to those laboratories which are properly staffed and qualified. The present situation shows that there are more technicians than jobs; consequently many have left for other work or have been married. This condition is in contrast to propaganda that the commercial schools continually broadcast. It is suggested that the Council take the responsibility for rating laboratories and for other work in connection with the rating, and that the American College of Surgeons and the American Medical Association support the regulatory activities. It was also suggested in the discussion that physicians themselves are very often responsible for the present conditions, that they do not take care enough in the selection of laboratory technicians and are not insistent that they be properly qualified; it was the consensus of one of the discussants that legal regulations should be established in the qualifying of laboratory technicians, similar to the legal regulations which are now in force regarding the registration of the M.D.'s and R.N.'s.

Dr. John A. Ferrell, Associate Director, International Health Division, The Rockefeller Foundation, New York City, presented a paper on "The Need of Professionalization in Public Health." In this instance, professionalization means proper education and training standards for public health personnel. The speaker raised many questions such as—Is public health definitely a specialty and are special types of public health endeavor qualifiable? — Can they be recognized? — Are boards able to recognize qualified men? — Should others than physicians be qualified? — Should qualification be done on a national basis? It was not the intention of the author to discuss the answers to all these questions, but merely to show the present status of the professionalization of public health work. It is well known that the basis for much of the necessary knowledge of public health is general training. A review of the British system was given, which requires regulation of all health officers through a recognized system of qualification; in Great Britain and Canada all health officers are physicians regularly registered and properly qualified. In the United States no such system has been in effect, although attempts have been made in various areas to put the system on a regulated basis. The laws of 38 states require the health officers to be physicians, but the only reference to health officers having a doctorate in public health occurs in the State of Michigan. Approximately 64% of health officers of large cities (over 10,000 population) are physicians. It is recognized that authority for qualification should be centralized; possibly the National Board of Medical Examiners could be used as a national qualifying body.

Dr. F. J. Gaenslen, Professor of Orthopedic Surgery, University of Wisconsin Medical School, Madison, presented a paper on "Who Should Teach Physical Therapy." A review of the growth of physical therapy in the past years shows that emphasis has been misplaced on apparatus to the neglect of the real foundations of physical therapy, water, heat, massage, and exercise. The foundations of a course in physical therapy should be laid in didactic and practical work, showing the usefulness of the application of physical therapeutic methods in conditions other than injuries. It is important that comprehensive work be correlated with clinical applications and that this should be done through the department of physical therapy, but also in all departments (through the heads) where the

application of physical therapy can be made. The limitations of physical therapy should be stressed; it is important to make a proper diagnosis and understand the underlying pathology present in each individual case before prescribing physical therapeutic treatment. If this is not done, physical therapy will come into disrepute. Only large institutions having properly qualified and trained personnel can attempt to train physical therapists on an extensive basis.

Dr. Harry E. Mock, Chairman of the Council on Physical Therapy of the American Medical Association, spoke on the subject "The Council on Physical Therapy of the American Medical Association — Its Problems and Its Progress." So-called machine therapy rose up over the whole United States, following the World war and pushed simpler forms into the background. Too many times scientific papers were overlooked and commercial propaganda was used in the effort to get every physician to install apparatus for the wholesale application of physical therapy in his office. The commercialization of the specialties became so extensive that insurance companies issued orders that payments would not be made for physical therapy treatments. The use of physical therapeutic apparatus extended to beauty parlors, athletic clubs, and other organizations and advertisements were then issued direct to the general public, rather than restricting them to medical and surgical journals. In 1926, as a result of the rapid commercialization of this field, the Council on Physical Therapy of the A.M.A. was established, this council now consisting of eleven members; the aims are briefly as follows: (1) to protect the medical profession and the public against improper and unethical advertising; (2) disseminate reliable information enabling the practicing physician to choose the proper type of apparatus and adapt it to his practice; (3) to act in an advisory capacity to organizations and individuals desiring advisory information. The Council has published lists from time to time regarding accepted and rejected forms of apparatus, based on rigid investigations, sometimes occupying months and years. The efforts of the Council on Physical Therapy have been largely cooperative and not restrictive or arbitrary; in many instances manufacturers have seen the necessity for this type of work and have gladly made suggestions which were of considerable use to the general public, as well as to the medical profession. It is important to remember that certain basic principles should be well understood before "hand" therapy and "machine" therapy can be properly and technically applied. It was impossible for the speaker to list the various functions of the council in detail, but special studies have been made on radiant sources, on electrosurgery, on inhalation apparatus, diathermy apparatus, colonic irrigation and therapy, as well as in other important fields. Finally, the work of the Council on Physical Therapy has shown a definite need for adequate and scientific information and its continuance will act as a safeguard against the improper use of apparatus, the commercialization of this important field, and the exploitation of the public.

## Meeting on Industrial Dust Hazards

DR. FREDERICK WILLSON of Reading, Pennsylvania was the speaker at the March meeting of the Engineering Division of the Chicago Safety Council, held at the Palmer House, Chicago, on March 16. The subject of Dr. Willson's presentation was "Personal Protection of the Worker Against Dust Hazards in Industry," and the substance of his remarks follows:

We have to recognize that all forms of dust are not equally dangerous to the exposed employees; although this is well-known to those who have studied the subject scientifically, it is not so evident to those with less experience that both relatively harmless and harmful types of dust are found in manufacturing processes.

The body is particularly constructed in such a way as to provide natural defenses against inhalation of any kinds of dust, and although some kinds of dust are capable of producing diseases in the lungs, the great majority are only capable of producing irritating effects in the nose and throat. The tolerance of different individuals varies greatly in this respect.

Another important consideration is the size of the dust particles; it is quite likely that particles over 10 microns in diameter never get into the lung tissue proper; on the other hand particles below five microns in diameter commonly reach the air sacs, and we are particularly interested in particles one micron in diameter and smaller because it is these that quite likely cause the greatest damage.

In making a classification of different dusts we have first to consider the chemical dusts which are definitely poisonous, such as lead, arsenic, mercury, and others; these dusts because of their chemical nature produce systemic poisoning when inhaled in sufficient quantities. The second important group are what are known as non-poisonous dusts of which examples are calcium, iron, and other inert minerals, as well as some of the organic dusts of vegetable origin. The third class in which we are particularly interested are those which produce local poisonous effects, such as free silica, asbestos, and diatomaceous earths; these differ from the foregoing dusts in that they are capable of producing progressive pathological changes in the lungs.

The matter of individual susceptibility is a very difficult one to estimate; it is practically impossible to measure the susceptibility of any given individual previous to his exposure except where it is known that latent tuberculosis exists; in such instances it is now recognized that such an individual would be more prone to develop an injurious local reaction in the lungs when exposed to injurious dusts than one who was free from a tuberculosis infection.

The liability in contracting silicosis or asbestosis can be expressed directly in terms of the concentration of the small particles in the inhaled air.

It has recently been shown by observation on a number of cases that silicosis does not develop in certain instances, at least, until a considerable period of time has passed, after the original exposure. There is therefore what might be called a latent period during which the insoluble silican dioxide is transformed chemically into a colloidal substance which has been called silica sol. This soluble form is capable of producing an irritation of the interstitial tissue of the lungs, resulting in an extensive and progressive fibrous reaction.

The outlook for persons who have developed well-established silicosis is very unfavorable, but even here the exercise of a great deal of judgment is necessary, and each case must be settled individually on its own merits.

In the prevention of difficulties arising from the inhalation of industrial dusts there are a number of practical points: much can be done by the installation of adequate exhaust ventilation systems which must be properly maintained from time to time and which should remove a considerable amount of dust at the source of its production.

Another important practical point is what is known as proper plant house-

keeping, which involves all methods used to keep the amount of dusts in the inhaled air at a minimum. Personal protection in the form of various types of devices is the third practical point in the prevention of dust diseases; it is understood that it is better not to make use of the wearing of respiratory devices if processes of manufacture permit the cleansing of the atmosphere by mechanical methods; there are however certain instances where it is necessary to use both kinds of protection.

In outlining specific procedures the following suggestions are of considerable importance:

1. The examination of workmen at the time of employment. This should include a careful occupational history in which is clearly set forth the previous types and kinds of occupation which the applicant has pursued, with a special reference to dust exposure; in conjunction with this there should be a careful physical examination, and x-ray films should be made to make selection as careful as possible and rule out the possibility of there being a disease process already started in the lungs of the applicant for employment.

2. Sanitary working conditions should be strictly supervised; this will include the provision of proper lockers, change rooms, adequate cleansing arrangements to keep down the dust to a minimum, and also the important provision for a periodic examination every six months and an exit examination accompanied by x-ray films of the chest when employment is terminated. The importance of sanitary provisions will be clearly recognized when it is understood that when dust is fairly disseminated through the work rooms, a period of eight hours is required before settling of particles of the order of one micron in size is finally accomplished; it can be said therefore that particles of this order of size may be suspended indefinitely in the atmosphere which is breathed by the employee.

3. In considering supplying personal protective devices there are two kinds in general use: the so-called air helmet which provides fresh air to the wearer and the respirator which filters out the dust particles. An important principle regarding these devices is that they should be both economical and comfortable—comfort however must not be sacrificed to efficiency — it is always possible to supply comfortable respirators which are not filtering out enough dust to be of protective value. Another important point is that the apparatus and the man who wears it must be kept clean (that is free of dust) if the apparatus can be expected to function properly. An efficiency of over 90% should be required of protective apparatus without there being uncomfortable breathing resistance, if it is to be of practical value for protective purposes. The selection of protective equipment should be made with great care, and those who are vested with the responsibility of providing this kind of protection for their employees should thoroughly understand what the device can do and what its limitations are; the reason for this can be easily understood when it is known that the employer may be called upon in a court of law to defend his selection. He must therefore be thoroughly familiar with the best kind of apparatus which is available.

4. Shop education is the last but not the least important of these practical aids. As this name implies it consists of giving quietly and without hysterical flavor real information as to the danger involved in working in dusty occupations. It is only by this method of actual dissemination of information that the cooperation of employees may be


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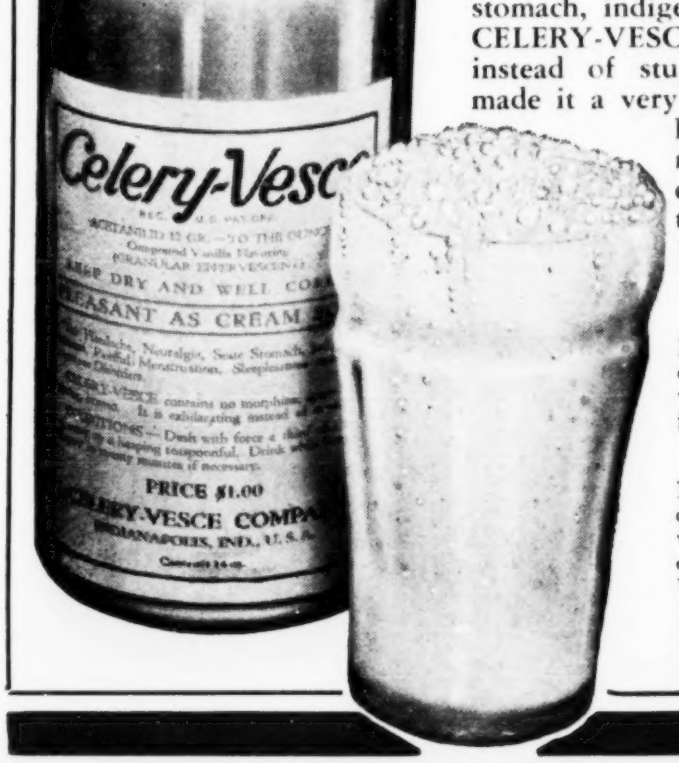


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When an employer and employee understand the reason for the use of protective devices and methods, very little difficulty will be encountered in securing acquiescence to any reasonable regulations. It is important that these methods start with the manager of the plant — it is fallacious to believe that unless the manager understands and is thoroughly "sold," superintendents, formen, and other employees will ever be in the proper frame of mind to secure the best results.

Finally, dust problems in industry are susceptible to control through the combined use of protective methods which are now available to everyone and the proper dissemination of simple forms of adequate information based on scientific research.

## Industrial Hygiene Program

THE TENTATIVE program for the meetings of the Industrial Hygiene Section of the American Public Health Association at Indianapolis, October 9th to 12th, 1933, shows a very interesting selection of subjects, covering a wide scope, which should be of interest not only to industrial hygienists, but in many cases to the general public as well.

The three sessions tentatively show the following speakers and subjects:

*First Day*

1. Silicosis Among Tunnel Workers in the New River District; an Unusually Acute Form; Case Reports and Autopsy Findings, by Dr. L. R. Harless.
2. The Pathological Lesions in so-called Acute Silicosis, by Dr. Leroy U. Gardner.
3. The Silica Content of the Lungs of a Group of Tunnel Workers, by Dr. Clayton S. Smith and Helen L. Wikoff, Ph. D.

*Second Day*

1. Poisoning by Petroleum Distallates—Case Reports, by Dr. Emery R Hayhurst.
2. Treatment of Cyanide Poisoning, by K. K. Chen, Ph.D., M.D., Chas. L. Rose, B.S., and G. H. A. Clowes, Ph. D.
3. Dermatitis in Some Specific Industry, by Dr. Louis Schwartz.
4. Visual Disturbances Due to Carbon Tetrachloride — Case Reports, by Dr. Z. T. Wirtschafter.

*Third Day*

1. Occupational Disease Legislation, by Andrew J. Farrell.
2. Pulmonary Asbestosis, by Dr. J. Donnelly.
3. Physiological Findings in Flight Fatigue, by Dr. Wade Hampton Miller.
4. Thorium as a Hazard in Roentgenology, by Dr. R. Pomeranz.
5. The Scope and Purpose of Aviation Medicine, by Col. A. P. Clark.

## Rating Plan in Effect

THE DETAILS on the industrial occupational disease schedule rating plan effective April 1st, 1933, and formulated by a sub-committee of the Wisconsin Compensation Rating and Inspection Bureau has been released to various manufacturers throughout the state of Wisconsin. This plan has also been concurred in by the Industrial Commission of Wisconsin and approved by the Wisconsin Compensation Insurance Board.

The regulations apply to foundry operations and to stonecutting and polishing procedures, including carving and lettering.

Of particular interest are the specifications regarding dust counts which are listed according to the percentage of silica content of sand used and the dust particles less than 10 microns in size per cubic foot of air; these values are as follows: from 91% to 100% inclusive, 5,250,000; 81% to 90% inclusive, 6,750,000; 71% to 80% inclusive, 8,250,000; 61% to 70% inclusive, 9,750,000; and from 51% to 60% inclusive, 11,250,000. The dust particles are to be counted in accordance with the U. S. Public Health Service technique and in making dust determinations, a sufficient number of dust counts must be made, by an approved disinterested agency, to show representative conditions throughout complete cycles of dusty operations. The counts shall be made from samples taken from the normal breathing zone of the workmen at such times as will include the worst conditions and must cover at least one sample in specific operations outlined in the code, if such operations are present in the plant.

The rules of procedures governing the application of the industrial occupational disease rating schedule plan include the following principles:

1. The schedule may include all risks involving operations from which any form of occupational disease may arise.
2. The schedule is one of charges which are removable if established standards and requirements are met.
3. The number of charges and the amount of charge loadings may vary as between industries and classes of work.
4. In connection with risks wherein operations other than those subject to treatment of this schedule are performed, the amount of the charge loadings shall be pro-rated in proportion to the employee-ratio of exposure.
5. The procedure respecting the period for which the rates resulting from this plan are available together with the procedure in connection with the making of surveys, interim surveys and checking surveys shall be the same as that followed in connection with the application of the industrial compensation rating schedule.
6. The definition of the term "Risk" shall be the same as that followed in connection with the application of the industrial compensation rating schedule.
7. The rates resulting from the application of this schedule shall be added to the adjusted rates or to the manual rates of the risk being rated, according to whether or not the risk is subject to treatment by the industrial compensation rating schedule and or by the experience rating plan.
8. All tests to determine dust counts, chemical concentrations and similar determinations shall be made by a disinterested agency (to be approved by the Wisconsin Compensation Rating and Inspection Bureau) in the presence of a salaried employee of the carrier or of the Wisconsin Compensation Rating and Inspection Bureau, the expense to be borne by the employer.

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